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Pennsylvania Geological Survey

Fourth Series

OIL AND GAS DEVELOPMENTS IN PENNSYLVANIA IN 1956

By

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COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF INTERNAL AFFAIRS
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TOPOGRAPHIC AND GEOLOGIC SURVEY
Carlyle Gray, *State Geologist*
APRIL 1957

P38.12
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OIL AND GAS DEVELOPMENTS
IN PENNSYLVANIA IN 1956

By

William S. Lytle(1)

ABSTRACT

Five successful deep (Middle Devonian or deeper) wildcats completed during 1956 in western Clearfield, Indiana, and Westmoreland counties have discovered one gas field, one gas pool and possibly extended three gas fields. Production is from the Onondaga chert - Oriskany sandstone section. Hydraulic fracturing of this section has become a standard completion practice in the above counties and also in southeastern Jefferson County. Operators concentrated their exploration drilling in these counties during 1956. The Jacksonville field, Indiana County, with four completions whose initial open-flow capacities were 3,790 thousand cubic feet of gas per day per well after fracturing, and the one well pool St. Boniface Chapel, Westmoreland County, open-flow capacity 11,000 thousand cubic feet of gas per day after fracturing, were the outstanding discoveries in Pennsylvania during 1956. A wildcat well in Venango Township, Erie County, found six feet of Oriskany sand and 399 thousand cubic feet of gas. The Hicks Run pool in the Benezette-Driftwood field was an Oriskany sandstone discovery during 1956. The development of the Rockton and Reed-Deemer fields continued with 22 producers and 6 producers respectively completed in each field in fracture type reservoirs. In the Oriskany sand gas territory of Erie County, the development of the Meade gas field was essentially brought to completion with the drilling of 34 gas wells and 11 dry holes during the year. The developed area now includes about 1600 acres. One hundred forty-three deep wells were completed in Pennsylvania in 1956, with a total footage of 717,227. Eighty-one of these were gas wells, 46 were dry holes, and 16 were drilled for gas storage.

Drilling activity in the shallow-sand territory of western Pennsylvania (Upper Devonian or higher) increased in 1956 over that of 1955. In all, 911 shallow-sand wells were completed. Of these 185 were gas wells, 19 were oil wells and 47 were dry holes. Six hundred sixty were drilled in connection with secondary-recovery oil operations. In addition to the 911 new wells, 22 wells were deepened outside the secondary-recovery oil operations and 80 wells were deepened in connection with secondary-recovery oil operations. The total footage for the new and deepened wells was 1,743,693. The Speechley sandstone and a sandstone at the horizon of the Bradford Third sand, two productive gas horizons, have responded very favorably to hydraulic fracturing. Most of the shallow-sand activity was in the Bradford field in secondary-recovery projects and in the gas fields of west-central Pennsylvania.

Oil production decreased from 8,505,000 barrels in 1955 to 8,231,000 barrels in 1956. Pennsylvania's proven oil reserves were estimated at 134,700,000 barrels as of December 31, 1956. Gas production decreased from 123,604,000 thousand cubic feet in 1955 to 118,416,000 thousand cubic feet in 1956. The total footage drilled both shallow and deep amounted to 2,460,920.

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INTRODUCTION

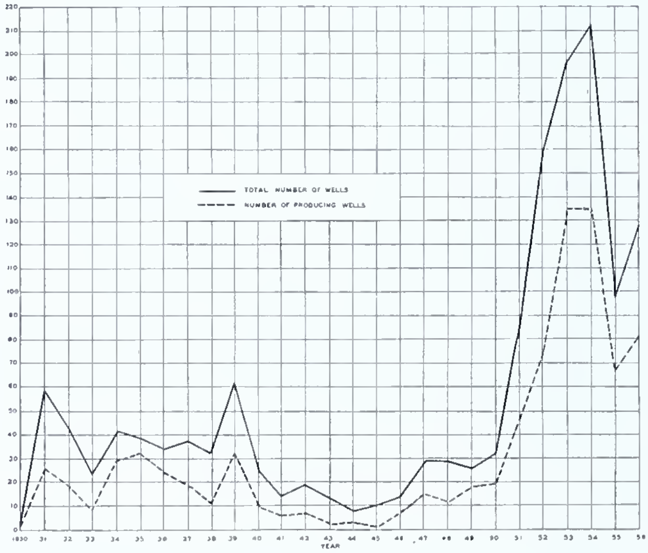
This report covers oil and gas developments in Pennsylvania during 1956. The summarized records of deep wells (Middle Devonian or deeper) assembled in Table 1 are intended to supplement those in Table 1, Bulletin M31, Fourth Series of the Pennsylvania Topographic and Geologic Survey and those in Table 1, Bulletin M39, and Table 1, Progress Report 150. Bulletin M31 includes those deep wells completed prior to 1950, Bulletin M39 those drilled between 1950 and 1955, and Progress Report 150, those drilled during 1955. Shallow-sand (Upper Devonian or higher) activities during the latter period are described in Progress Reports 135, 139, 143, 144, 147, and 150 of the Pennsylvania Topographic and Geologic Survey.

ACKNOWLEDGEMENTS

In connection with the preparation of this review, the writer acknowledges the cooperation of G. G. Bauer, Chas. R. Fettke, and Paul W. Garrett, Jr. Virginia Fairall of the Pennsylvania Bureau of Topographic and Geologic Survey staff did the drafting and assisted with the compiling of the data.

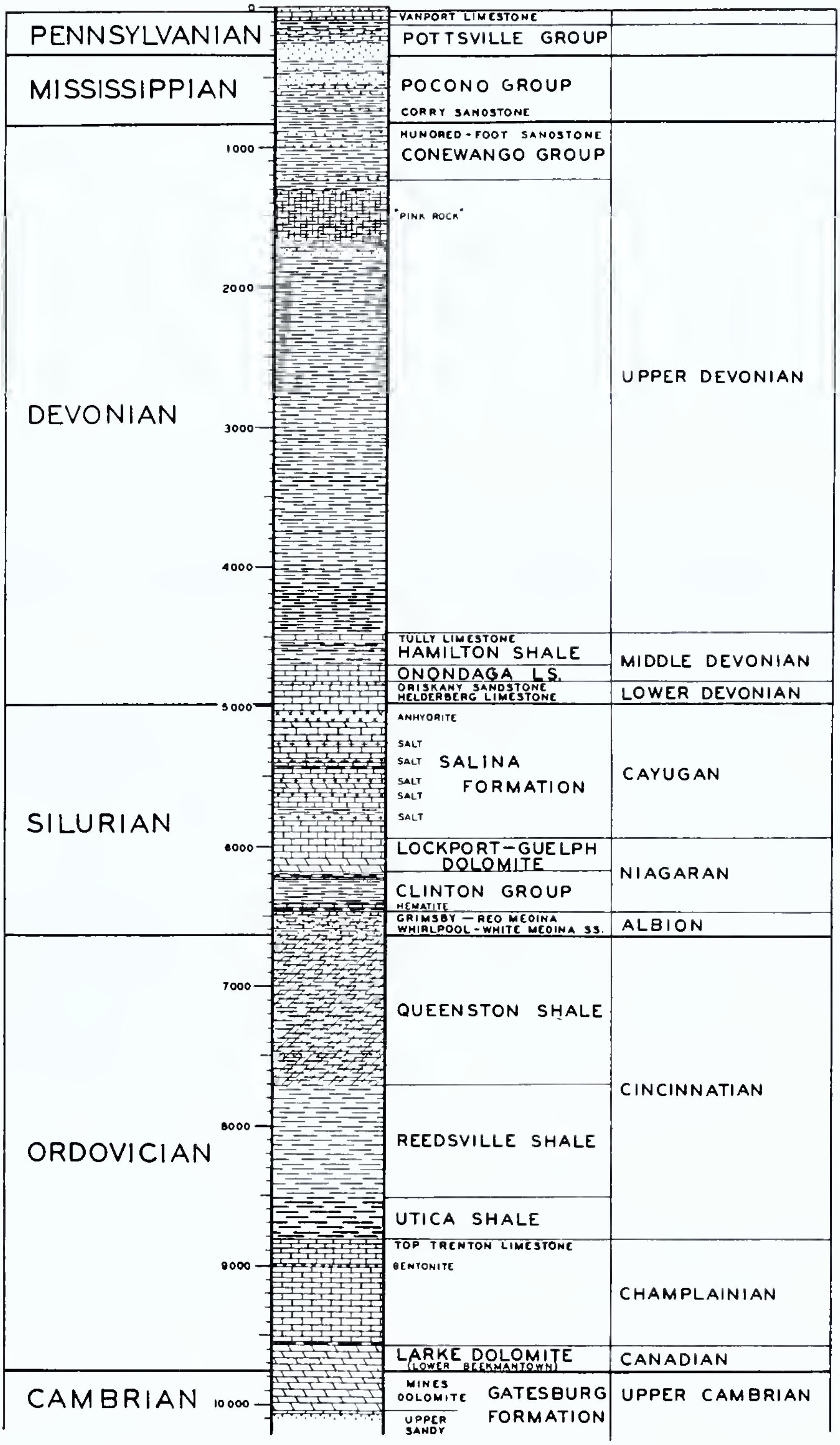
DEEP-SAND DEVELOPMENTS

Summarized records of the deep wells completed in northeastern, north-central and western Pennsylvania are assembled in Table 1. The location of the wells are shown on the map in Plate 1 and the stratigraphic positions of the formations tested in Plate 2. By the end of 1956 a total of 1,568 deep wells had been drilled in Pennsylvania. Prior to 1930 only 36 deep wells had been drilled. Of the 1,568 deep wells drilled to date, 850 were gas wells, 651 were dry holes and 67 were drilled in connection with gas storage.



ANNUAL RATE OF DEEP SAND EXPLORATION AND DEVELOPMENT
Figure 1

Of the 141 wells drilled in 1956 to the Oriskany or deeper, 80 were gas wells, 45 were dry holes, and 16 were drilled for gas storage. Another one was completed as a producer in the Onondaga chert and a second one was abandoned after drilling through the Tully limestone at the top of the Middle Devonian series. The total footage of these deep wells amounted to 717,227 feet. One hundred forty-three deep wells were completed in 1956, as compared with 115 in 1955, an increase



COLUMNAR SECTION
WESTERN PENNSYLVANIA
OBTAINED IN JESSIE G. HOCKENBERRY WELL NO. 1
MANUFACTURERS LIGHT & HEAT COMPANY
MERCER TOWNSHIP, BUTLER COUNTY, PA.

CHAS R FETTKE 1953

Plate 2

of 24 percent. The increase in the number of deep wells drilled during 1956, over that of 1955, was due to development drilling in the Meade field of Erie County, and the wide-spread hydraulic fracturing-stimulated exploratory drilling program in southwestern Pennsylvania. The annual rate of deep-sand exploration and development since the discovery of the Tioga field in 1930, the first deep-sand field to be opened in Pennsylvania, is shown in Figure 1. A summary of deep-well completions in 1956 for Pennsylvania is shown in Table 2.

Table 2. Summary of Deep Well Completions 1956

	Development	Development	Wildcat	Wildcat	Storage	Storage
Gas	74		7		13	
Dry		23		23		3
Footage	368,641	108,800	46,853	112,936	64,000	15,997

Only one well was drilled in the Benezette-Driftwood, Oriskany sand gas field of southeastern Elk County during 1956. The 1956 production amounted to 15,768,000 thousand cubic feet, making the total production of the field 196,182,000 thousand cubic feet at the end of 1956.

The Hicks Run pool in the Benezette-Driftwood field was discovered in the latter part of 1956 when the Ross St. John No. 2 by W. H. Wert, et al., was completed in the Oriskany sandstone with an initial open-flow capacity of 1,375 thousand cubic feet per day. The original reservoir pressure was 3,300 pounds per square inch. By the end of 1956, two dry holes and four producing gas wells were completed with average initial open-flow capacities of 1,150 thousand cubic feet of gas per day per well. The developed area is approximately 400 acres.

Eight wells were completed in the Greenlick pool, discovered in 1955, in the Leidy field in northeastern Clinton and adjacent southeastern Potter counties. Five of these were gas wells with average initial open-flow capacities of 18,997 thousand cubic feet per day. The largest well drilled in this pool in 1956 had an initial open-flow capacity of 87,000 thousand cubic feet per day. The other three wells were dry and delineated the northwest side of the southern half of the field. The developed area at the end of 1956 included about 2,800 acres. The Leidy pool, opened early in 1950, produced only 877,000 thousand cubic feet of gas in 1956; the Tamarack pool, 218,000 thousand; the Downs pool, 64,000 thousand.

Since the discovery of the Rockton, Reed-Deemer, and Nolo gas fields in western Clearfield and adjacent parts of southeastern Jefferson and eastern Indiana counties, operators have concentrated their exploration drilling in areas underlain by the Onondaga chert section of Middle Devonian age, which overlies the Oriskany sandstone. Five wildcat completions during 1956 in this area have paid off. These wells are the first major wildcats completed in southwestern Pennsylvania since hydraulic fracturing of the Onondaga chert section has become a standard practice.

One of these wildcats, the J. G. Mailey No. 1, of Peoples Natural Gas Company, in southern Westmoreland County was completed with an open-flow capacity of 11,000 thousand cubic feet of gas per day after fracturing the Onondaga chert section. The original reservoir pressure was approximately 4,100 pounds per square inch. The well is located near the crest of the Chestnut Ridge anticline, which in this area is a complexly faulted, steeply dipping anticline. The Mailey is the only well in St. Boniface Chapel pool and is separated by a fault from the Piper pool to the north.

The other four wildcats were dual zone completions in the Onondaga chert-Oriskany sandstone section. The G. L. Stewart - R. & P. Coal Co., No. 1 well of the Manufacturers Light & Heat Co., in Indiana County was the second important wildcat completed in this area in 1956 and the discovery well of the Jacksonville field. After fracturing, the open-flow capacity was 9,000 thousand cubic feet with an original reservoir pressure of approximately 4,230 pounds per square inch. At the end of 1956, four producers had been completed with average initial open-flow capacities of 3,790 thousand cubic feet of gas per day per well. The developed area is about 400 acres. A third wildcat, S. Yosurack No. 1 of Columbian Carbon Co., about four miles northeast of the Jacksonville field, came in at 3,610 thousand cubic feet per day, after fracturing. The original reservoir pressure was approximately 3,950 pounds per square inch. The area between the Jacksonville field and the Yosurack well is currently being tested.

The fourth wildcat in this area was the I. R. Smith No. 1 well of the Columbian Carbon Co., in Indiana County, completed in 1956 at an open-flow capacity of 1,540 thousand cubic feet per day after fracturing. The original reservoir pressure was approximately 4,250 pounds per square inch. This well is located in the southern part of the Dias Ridge dome of the Nolo anticline.

The Pennsylvania Tract 63, No. 1 well of the New York State Natural Gas Corp., in Clearfield County, was the fifth wildcat completed in the area in 1956. It is located about seven miles northeast of the Rockton field. After fracturing, the open-flow capacity was 6,981 thousand cubic feet per day at an original reservoir pressure of 3,840 pounds per square inch.

Twenty-two producing gas wells and four dry holes were drilled in the Rockton field on the northwest flank of the Chestnut Ridge anticline in Clearfield County during 1956. The average initial open-flow capacities of these 22 wells was 2,429 thousand cubic feet of gas per well per day after fracturing the Onondaga chert and Oriskany sandstone section. The developed area now includes about 1,800 acres. The Reed-Deemer field just southwest of the Rockton field along the trend of the Chestnut Ridge anticline had six gas wells completed and one dry hole during 1956. The average initial open-flow capacities of the six gas wells was 1,444 thousand cubic feet of gas per day per well, after fracturing the Onondaga chert and Oriskany sandstone section. The developed area now includes about 1,800 acres. .The Rockton and Reed-Deemer fields produced a total of over 5,000,000 thousand cubic feet of gas in 1956.

The J. Thompson #1 well by G. E. Olson, et al., in Venango Township, Erie County, found six feet of Oriskany sandstone with an initial open-flow capacity of 399 thousand cubic feet of gas per day at a rock pressure of 745 pounds per square inch. An outpost well, Evans #1 well by Olson, about 1,000 feet southeast of the Thompson #1, was dry in the Oriskany. See Nos. 99 and 98 of Table 1 and Plate 1.

The Meade Oriskany sand gas field, discovered in 1954, of Erie County, continued its "town-lot" type of exploitation during 1956. Thirty-four gas wells and 11 dry holes were completed during 1956. The 34 gas wells had average initial open-flow capacities of 7,315 thousand cubic feet per day. The largest reported in 1956 was 30,000 thousand cubic feet. These wells were not completed by hydraulic fracturing. The developed area now includes about 1,600 acres. The Harry Will #2 well by Vinopal in the Meade field had an initial open-flow capacity of 17,603 thousand cubic feet per day of gas and five barrels per day of oil. The oil is being produced from the Onondaga limestone. By the end of 1956 the well had produced about 400 barrels.

One unsuccessful test was completed in each of Lycoming and Wayne counties during 1956. The Tranor well in Lycoming County drilled through a thick section of Catskill and Chemung beds, Upper Devonian in age, and was completed at a depth of 7,169 feet. The Penn York Hess well in extreme northeastern Pennsylvania, Wayne County, bottomed at 5,404 feet. The Albert well in Snyder County was an unsuccessful Clinton test. See No. 137 of Table 1 and Plate 1.

Two Salina tests were unsuccessful. These were drilled in Bradford and Erie counties. See Nos. 2 and 100 of Table 1 and Plate 1.

Two unsuccessful Albion (Medina) tests were completed in Crawford County. Shows of gas were reported in each well. See Nos. 41 and 42 of Table 1 and Plate 1.

Three Cambrian tests were drilling during the year. By the end of December, two were completed as dry holes and the third one was still drilling. One of the completed tests, E. McKnight #1, Mercer County, reported live green oil bleeding through the horizontal fractures of the Lockport core (Middle Silurian). Both completed wells tested the Gatesburg sandstone (Upper Cambrian). See Nos. 70 and 118 of Table 1 and Plate 1. The third Cambrian test, Shaw #1, by Biery, in Warren County, reported 75 thousand cubic feet of gas in the Beekmantown (Lower Ordovician) and drilling ahead at 9,381 feet.

SHALLOW-SAND DEVELOPMENTS

Shallow-sand well completions in western Pennsylvania, exclusive of those drilled in connection with underground gas storage or secondary-recovery oil operations, are shown in Table 3. During 1956, 251 such wells were drilled, of which 74 percent were gas wells, 8 percent were oil wells, and 18 percent were dry holes.

The 185 new gas wells had a total initial open-flow capacity of 86,913 thousand cubic feet per day, as compared with the total initial open-flow capacity of 53,468 thousand cubic feet of the 214 gas wells completed in 1955. Hydraulic fracturing was introduced in Pennsylvania's shallow-sand fields in 1955. Initial open-flow capacities have shown a marked increase since the introduction of this fracturing method. The figures for 1956 are obtained after hydraulic fracturing where this method of completing the wells was used. Of the 185 new gas wells completed, 116 were hydrafraced. The combined initial open-flow of the 116 wells was 73,824 thousand cubic feet after hydrafracing, as compared with 3,177 thousand cubic feet before. Of the 16 gas wells deepened, seven were hydrafraced. The combined initial open-flow of the seven wells was 6,377 thousand cubic feet after hydrafracing, as compared with 243 thousand cubic feet before. The 19 new oil wells completed in 1956 had a total initial production of 53.4 barrels per day, as compared with the total initial production of 80 barrels for the 17 new oil wells completed in 1955. The results obtained in 1956 by deepening 22 shallow-sand wells are shown in Table 4.

The three columnar sections appearing in Figure 2 show the stratigraphic positions of the Upper Devonian and higher oil and gas sands of western Pennsylvania from southwest to northwest along the trend of the producing belt shown in Plate 1.

Table 3. Shallow-Sand Well Completions in Pennsylvania in 1956*

	TOTAL		GAS			OIL			DRY	
County	No. of Wells	Aver. T. D. (Feet)	No. of Wells	Aver. Init. Open Flow (M. Cu. ft. per day)	Aver. T. D. (Feet)	No. of Wells	Aver. Init. Prod. (bbls. per day)	Aver. T. D. (Feet)	No. of Wells	Aver. T. D. (Feet)
Allegheny	6	2799	5	255	2718	-	---	---	1	3200
Armstrong	78	3174	78	727	3174	-	---	---	-	---
Butler	6	1629	2	292	1107	1	3	1220	3	2113
Clarion	16	2554	12	315	2498	-	---	---	4	2720
Clearfield	2	2969	-	---	---	-	---	---	2	2969
Elk	1	2605	-	---	---	1	3	2605	-	---
Erie	1	1723	-	---	---	-	---	---	1	1723
Fayette	5	2685	1	231	1530	-	---	---	4	2974
Forest	16	1196	2	30	1945	9	2.2	908	5	1417
Greene	2	3088	-	---	---	-	---	---	2	3088
Indiana	23	3143	17	443	3035	-	---	---	6	3447
Jefferson	43	3069	37	384	3025	-	---	---	6	3337
McKean	14	2090	5	21	2223	8	3.5	1933	1	2677
Potter	2	1777	-	---	---	-	---	---	2	1777
Washington	9	2830	4	243	2938	-	---	---	5	2750
Westmoreland	27	3157	22	422	3194	-	---	---	5	2998
Total	251	2836	185	470	2002	19	2.8	1445	47	2743

*Does not include wells drilled in connection with underground gas storage or secondary-recovery oil operations.

Table 4. Shallow-Sand Wells Deepened in 1956*

	TOTAL		GAS			OIL			DRY	
County	No. of Wells	Aver. Amount Deepened (Feet)	No. of Wells	Aver. Init. Open Flow (M. cu. ft. per day)	Aver. Amount Deepened (Feet)	No. of Wells	Aver. Init. Prod. (bbls. per day)	Aver. Amount Deepened (Feet)	No. of Wells	Aver. Amount Deepened (Feet)
Allegheny	1	243	---	---	---	1	.5	243	---	---
Armstrong	6	1689	6	496	1689	---	---	---	---	---
Greene	3	258	1	22	570	---	---	---	2	102
Indiana	2	1301	2	165	1301	---	---	---	---	---
Jefferson	5	563	5	50	563	---	---	---	---	---
Washington	3	1006	---	---	---	2	36	480	1	2058
Westmoreland	2	801	2	1663	801	---	---	---	---	---
Total	22	963	16	428	1108	3	23.8	401	3	754

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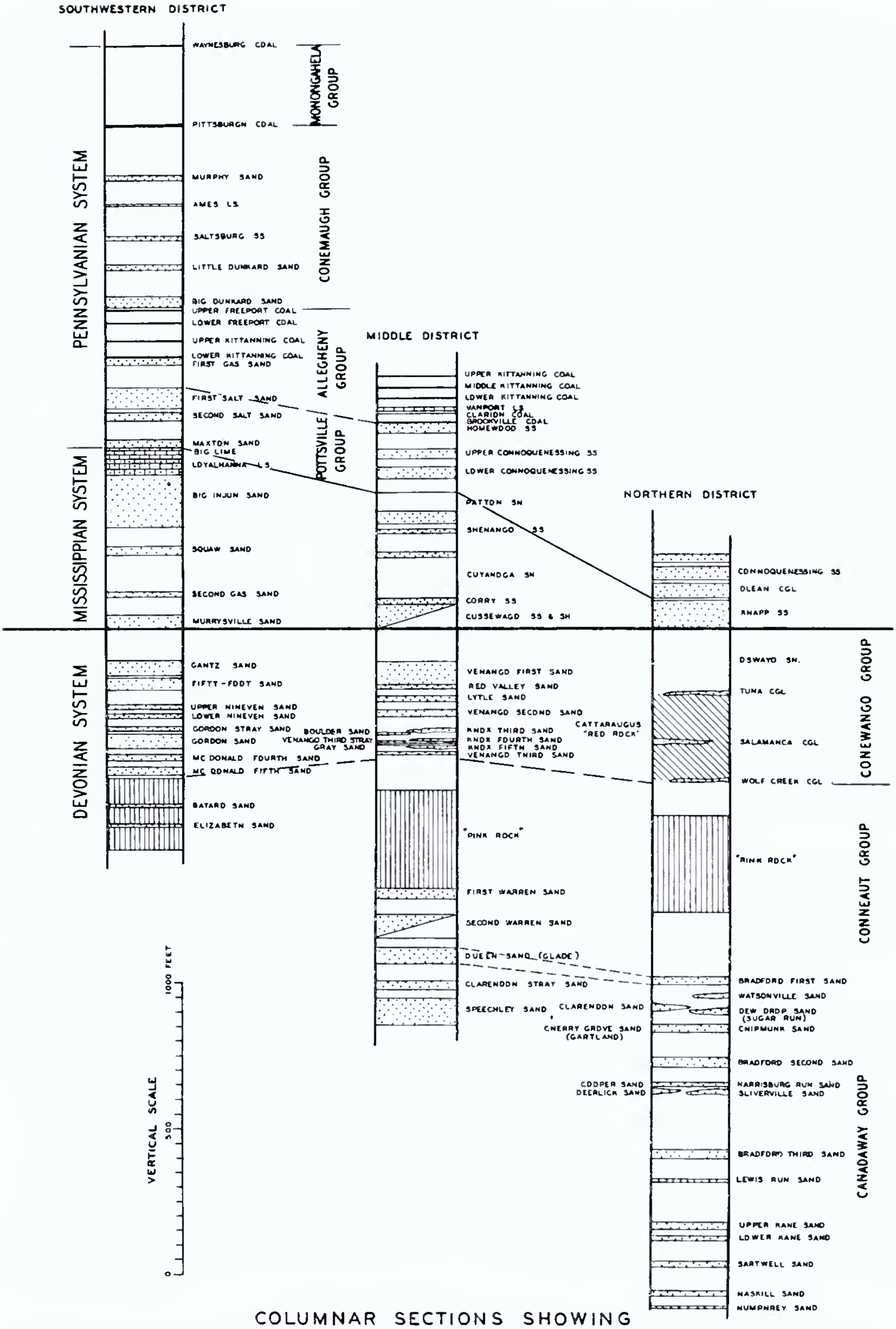
*Does not include wells deepened in connection with underground gas storage or secondary-recovery oil operations.



COLUMNAR SECTIONS SHOWING
STRATIGRAPHIC POSITIONS OF OIL AND GAS SANDS
OF WESTERN PENNSYLVANIA

CHAS R. FETTKE 1953

Figure 2

GAS

The Lawrence R. Richards #1 well of the Transcontinental Production Company, a deep test in Lackawanna County of northeastern Pennsylvania, encountered shallow gas, 100 thousand cubic feet per day in the Chemung group Upper Devonian. After drilling to the Oriskany horizon and finding no sand, the well was plugged back and completed as the first shallow gas well in the area. Two productive shallow gas horizons have responded very favorably to hydraulic fracturing in Pennsylvania, namely, the Speechley sandstone and a sandstone at the horizon of the Bradford Third. The greatest activity in the shallow-sand gas belt of western Pennsylvania occurred in Armstrong County, where 78 new gas wells were completed, 64 of which were hydrafraced. Hydraulic fracturing raised the combined initial open-flow capacities of the 64 wells from 1,480 thousand cubic feet per day to 42,453 thousand cubic feet, or more than 28 times. There were 22 new gas wells hydrafraced in Jefferson County, raising the combined initial open-flow capacities of these wells more than 29 times. No wells were drilled for underground storage of gas.

OIL

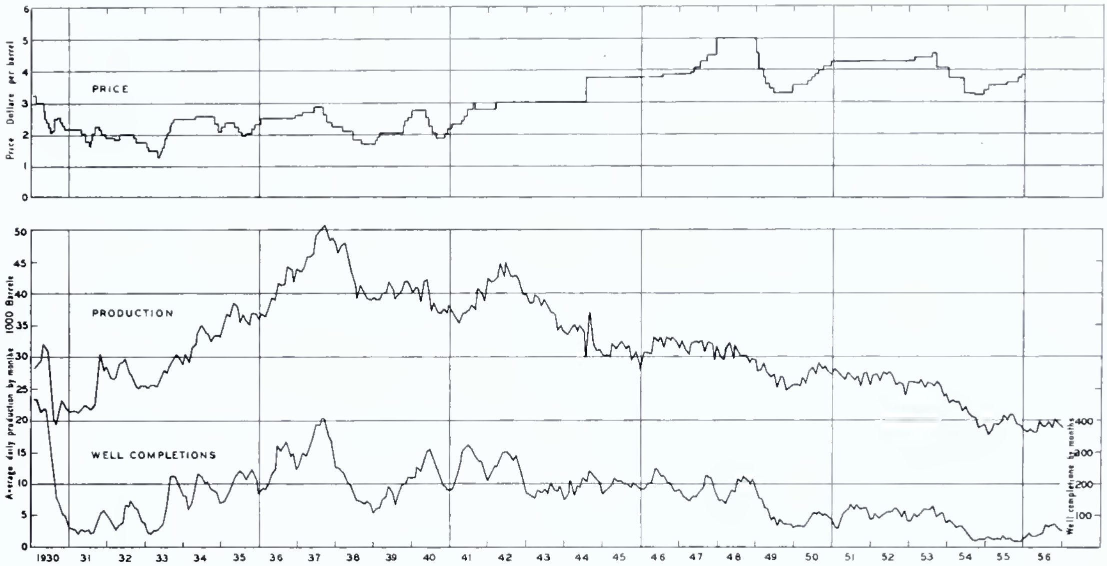
The average daily oil production of Pennsylvania in 1956 is estimated at 22,489 barrels, as compared with 23,300 barrels in 1955, a decline of 3.5 percent.

Crude oil prices during the year improved as shown in Table 5.

Table 5. Price Per Barrel

Date	Northern or Bradford District	Middle or Venango District	Southwestern District
January 1	$ 3.85	$ 3.72	$ 3.20
February 6	4.00	3.87	3.58
March 16	4.20	4.07	3.78
May 16	4.45	4.32	4.03
July 16	4.57	4.44	4.15
August 16	4.68	4.50	4.21

In the Bradford oil field, which includes the Bradford, Guffey, and Burning Well pools, 617 new wells were drilled in connection with secondary-recovery operations, as compared with 317 in 1955, an increase of 95 percent. Oil production in this field, 86 percent of whose area is in Pennsylvania, decreased from a daily average of 19,646 barrels in 1955 to 19,013 barrels in 1956, or 3.2 percent. Of the new wells, 555 were located in the Pennsylvania part of the field, and this part contributed 17,343 barrels of the daily average production. This represented 77 percent of the total production of the State for 1956. Hydrafracing of water-input wells and producing wells was instigated in 1956 in some of Pennsylvania's water-flood projects. About 20 wells were hydrafraced in these projects, but it is too early to evaluate the results of the fracturing. The relations between crude oil prices, production, and drilling activities in the Bradford field are shown in Figure 3.



CRUDE OIL PRICES, PRODUCTION AND WELL COMPLETIONS – BRADFORD FIELD

Figure 3

Fifty-eight wells were completed in the Kane-Clarendon area of southwestern McKean County and eastern Warren County. Two oil wells and two water-input wells were completed in Potter County in connection with water-flooding operations. In the Venango district of northern Venango and adjacent parts of Warren counties, 44 new wells were drilled in 1956 and four oil wells drilled deeper, as compared with 27 new wells in 1955, in connection with secondary-recovery oil operations. Of these, 27 were oil wells, 11 water-input and six air- or gas- intake wells.

Figure 4 is a generalized columnar section showing the oil-bearing sands subjected to air or gas drive or water flooding in western Pennsylvania. Plate 3 is a map showing the location and a listing of the oil fields of Pennsylvania which are being produced under secondary-recovery methods.

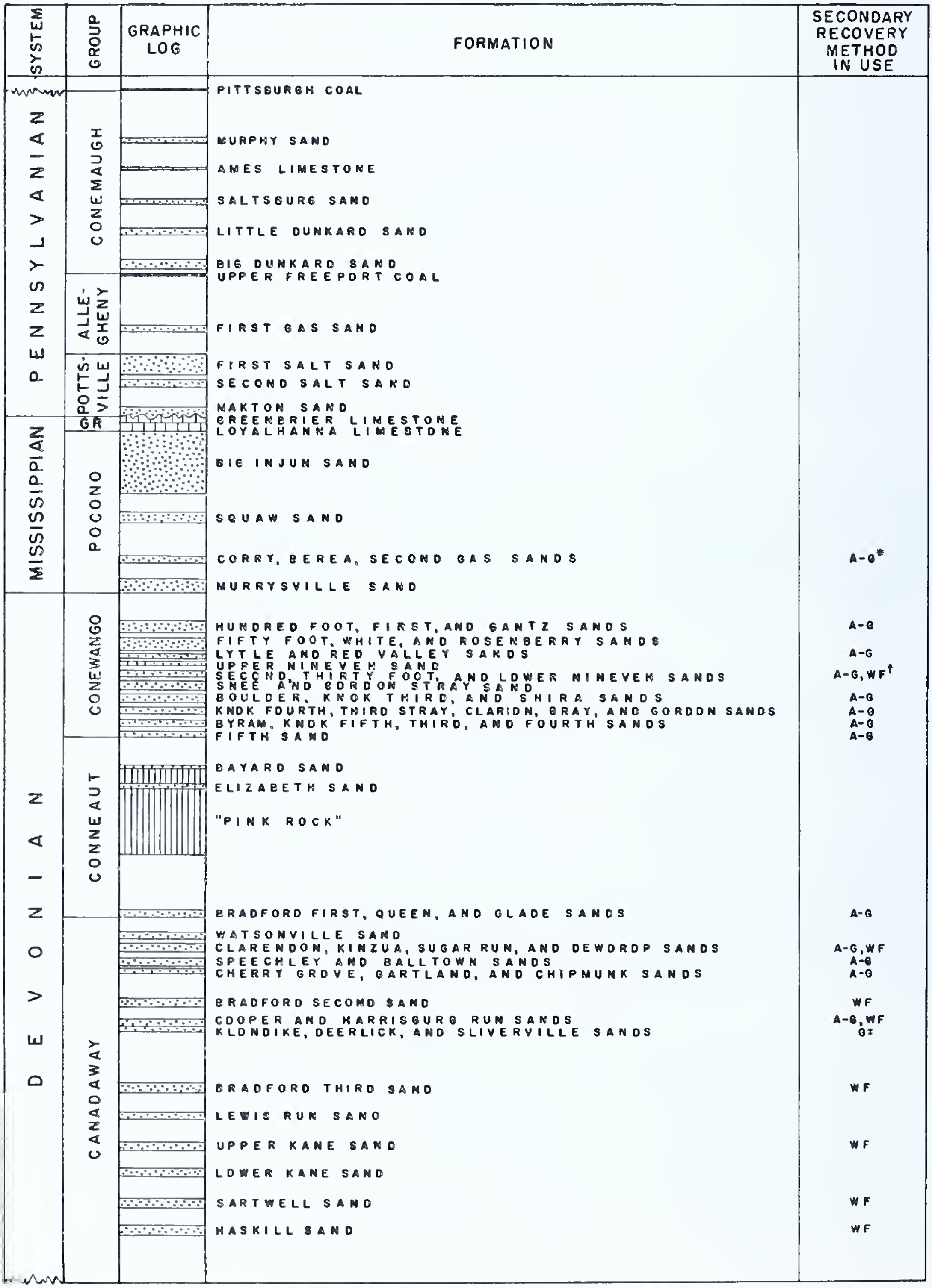
No new oil fields or pools were discovered in Pennsylvania during the year. The daily average oil production of the middle and southwestern districts of Pennsylvania was 5,180 barrels in 1956, as compared with 5,400 barrels in 1955, a decline of 4 percent. Nine oil producers and one dry hole were drilled in the Clough oil field of central Forest County extending this field to the southwest. A well deepened in the North Strabane Township of Washington County had an initial production of 65 barrels of oil per day from the Gordon sand. This well is located in the Gordon sand field, discovered in 1945, in the Hill Church area.

OIL AND GAS PRODUCTION

The total gas production in Pennsylvania during 1956 is estimated at 118,416,000 thousand cubic feet as compared with 123,604,000 thousand cubic feet in 1955. Table 6 shows the natural gas production in Pennsylvania by counties from 1951 to 1955. The oil production in Pennsylvania decreased from 8,505,000 barrels in 1955 to 8,231,000 barrels in 1956. The annual production of crude oil in Pennsylvania, showing the influence of secondary-recovery and other events on the production curve, is shown in Figure 5. The cumulative total production of oil and gas from 1859 to December 31, 1956, amounts to 1,194,388,000 barrels of oil and 6,969,909,000 thousand cubic feet of gas.

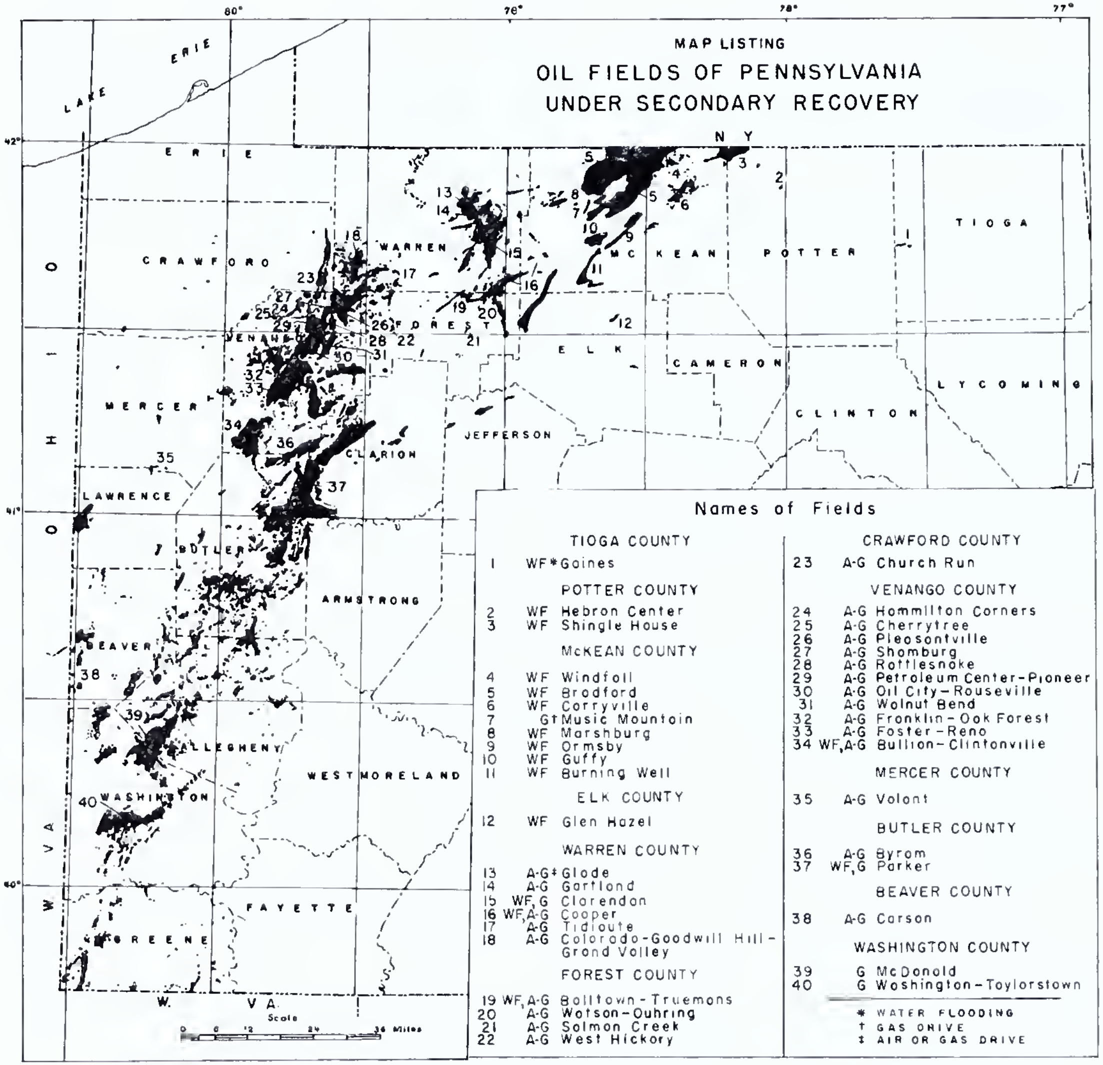
Figure 4

Generalized Columnar Section Showing the Oil Bearing Sands Subjected to Air or Gas Drive or Water Flooding in Western Pennsylvania



SYSTEM	GROUP	FORMATION	SECONDARY RECOVERY METHOD IN USE
		PITTSBURGH COAL	
PENNSYLVANIAN	CONEMAUGH	MURPHY SAND	
		AMES LIMESTONE	
		SALTSBURG SAND	
		LITTLE DUNKARD SAND	
		BIG DUNKARD SAND	
		UPPER FREEPORT COAL	
	ALLEGHENY	FIRST GAS SAND	
	POTTSVILLE	FIRST SALT SAND	
		SECOND SALT SAND	
		MAKTON SAND	
MISSISSIPPIAN	GR	GREENBRIER LIMESTONE	
		LOYALHANNA LIMESTONE	
	POCONO	BIG INJUN SAND	
		SQUAW SAND	
		CORRY, BEREA, SECOND GAS SANDS	A-G*
		MURRYSVILLE SAND	
DEVONIAN	CONEWANGO	HUNDRED FOOT, FIRST, AND GANTZ SANDS	A-G
		FIFTY FOOT, WHITE, AND ROSENBERRY SANDS	
		LYTLE AND RED VALLEY SANDS	A-G
		UPPER NINEVEH SAND	
		SECOND, THIRTY FOOT, AND LOWER NINEVEH SANDS	A-G, WF†
		SNEE AND GORDON STRAY SAND	
		BOULDER, KNOX THIRD, AND SHIRA SANDS	A-G
		KNOX FOURTH, THIRD STRAY, CLARION, GRAY, AND GORDON SANDS	A-G
		BYRAM, KNOX FIFTH, THIRD, AND FOURTH SANDS	A-G
		FIFTH SAND	A-G
	CONNEAUT	BAYARD SAND	
		ELIZABETH SAND	
		"PINK ROCK"	
		BRADFORD FIRST, QUEEN, AND GLADE SANDS	A-G
	CANADAWAY	WATSONVILLE SAND	
		CLARENDON, KINZUA, SUGAR RUN, AND DEWDROP SANDS	A-G, WF
		SPEECHLEY AND BALLTOWN SANDS	A-G
		CHERRY GROVE, GARTLAND, AND CHIPMUNK SANDS	A-G
		BRADFORD SECOND SAND	WF
		COOPER AND HARRISBURG RUN SANDS	A-G, WF
		KLONDIKE, DEERLICK, AND SLIVERVILLE SANDS	G‡
		BRADFORD THIRD SAND	WF
		LEWIS RUN SAND	
		UPPER KANE SAND	WF
		LOWER KANE SAND	
		SARTWELL SAND	WF
		HASKILL SAND	WF

* AIR OR GAS DRIVE
† WATER FLOODING
‡ GAS DRIVE



MAP LISTING

OIL FIELDS OF PENNSYLVANIA UNDER SECONDARY RECOVERY

Names of Fields

TIOGA COUNTY

1 WF* Gaines

POTTER COUNTY

2 WF Hebron Center
3 WF Shingle House

McKEAN COUNTY

4 WF Windfall
5 WF Bradford
6 WF Corryville
7 G† Music Mountain
8 WF Marshburg
9 WF Ormsby
10 WF Guffy
11 WF Burning Well

ELK COUNTY

12 WF Glen Hazel

WARREN COUNTY

13 A-G‡ Glade
14 A-G Gartland
15 WF, G Clarendon
16 WF, A-G Cooper
17 A-G Tidioute
18 A-G Colorado-Goodwill Hill-Grand Valley

FOREST COUNTY

19 WF, A-G Balltown-Truemans
20 A-G Watson-Duhring
21 A-G Salmon Creek
22 A-G West Hickory

CRAWFORD COUNTY

23 A-G Church Run

VENANGO COUNTY

24 A-G Hammilton Corners
25 A-G Cherrytree
26 A-G Pleasantville
27 A-G Shamburg
28 A-G Rattlesnake
29 A-G Petroleum Center-Pioneer
30 A-G Oil City-Rouseville
31 A-G Walnut Bend
32 A-G Franklin-Oak Forest
33 A-G Foster-Reno
34 WF, A-G Bullion-Clintonville

MERCER COUNTY

35 A-G Volant

BUTLER COUNTY

36 A-G Byram
37 WF, G Parker

BEAVER COUNTY

38 A-G Carson

WASHINGTON COUNTY

39 G McDonald
40 G Washington-Taylorstown

* WATER FLOODING
† GAS DRIVE
‡ AIR OR GAS DRIVE

Plate 3

Table 6. NATURAL GAS PRODUCTION IN PENNSYLVANIA BY COUNTIES: 1951 to 1955*

(In millions of cubic feet)

County	1951	1952	1953	1954	1955
Total for all counties	167,343	141,204	141,851	177,165	142,985
Allegheny	13,086	11,718	7,876	3,235	3,970
Armstrong	11,571	10,934	11,506	10,538	9,916
Beaver	16,493	18,053	15,299	12,614	13,954
Butler	910	854	786	810	756
Cambria	---	---	---	---	9
Cameron	---	4,417	12,704	11,287	5,329
Clarion	12,506	12,025	11,160	10,321	10,733
Clearfield	206	188	219	803	1,478
Clinton	45,416	25,149	3,452	1,919	6,158
Elk	7,066	5,039	36,983	83,218	37,777
Erie	100	398	119	286	258
Fayette	2,915	2,572	2,511	2,621	2,459
Forest	945	973	696	514	626
Greene	9,619	8,234	5,796	5,368	4,967
Indiana	2,842	2,475	2,296	2,525	2,604
Jefferson	7,978	8,260	5,915	6,105	6,853
Lawrence	19	7	8	6	6
McKean	3,520	3,440	2,796	2,433	2,594
Mercer	4,123	4,201	7,068	6,626	7,413
Potter	12,386	8,362	2,983	2,623	12,450
Tioga	12	145	46	256	5
Venango	842	822	670	630	666
Warren	454	432	303	416	378
Washington	9,792	7,907	5,059	4,269	4,432
Westmoreland	4,542	4,599	5,600	7,742	7,194

*Production data from Bureau of Statistics, Department of Internal Affairs, Pennsylvania.

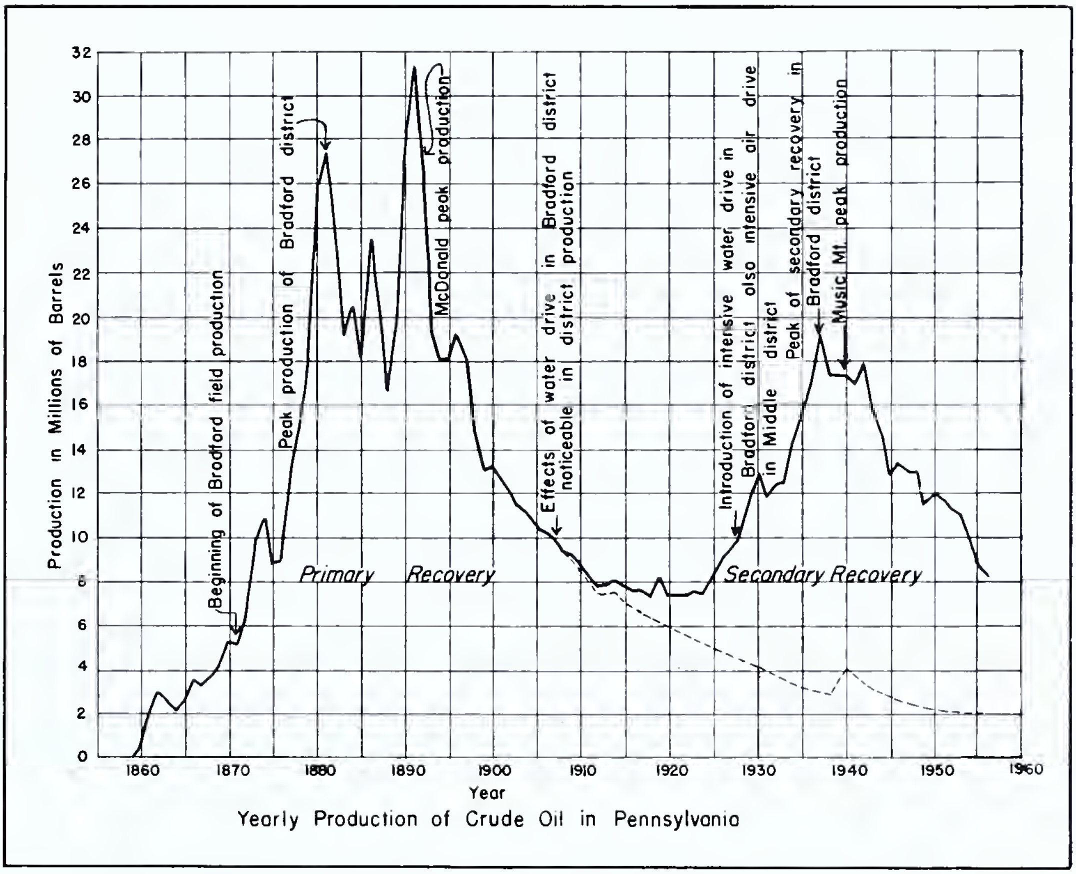


Fig. 5 - Annual production of crude oil in Pennsylvania, showing the influence of secondary recovery and other events upon the production curve

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SHEET I

TABLE I SUMMARIZED RECORD OF DEEP WELLS DRILLED IN PENNSYLVANIA 1956

ELEVATIONS AND DEPTHS ARE IN FEET

COUNTY		Bedford	Bradford	Centre	Clearfield	Clearfield	Clearfield	Clearfield	Clearfield	Clearfield	Clearfield
MAP NUMBER		1	2	3	4	5	6	7	8	9	10
NAME OF WELL		R. C. Rice 1	Anna Carver 1	Pa Game Lands 1	Bolton-Gilmore 1	Brewer 1	Conrad Heirs 1	Dubois Brewing Co. 1	Haas & Rockey 1	C. P. Harris 1	Milton Hartzfeld 1
OPERATOR		John T Goley	Parsons Bros.	Clearfield Development Co.	Fairman Drilling Co.	John Fox	Rockton Drilling Co.	Keta Gas & Oil Co.	Fairman Drilling Co.	Godfrey L. Cabot Inc.	New York State Nat. Gas Corp.
TOWNSHIP		Monroe	Ridgebury	Union	Brady	Union	Union	Brady	Brady	Brady	Brady
QUADRANGLE		Clearville 2	Sayre 5	Bellefonte 1	Penfield 12	Penfield 13	Penfield 14	Penfield 37	Penfield 15	Penfield 16	Penfield 17
LATITUDE		.60 mi. N. 39°50'	1.15 mi. S. 42°00'	1.65 mi. S. 41°00'	1.17 mi. S 41°05'	.13 mi. N. 41°05'	.32 mi. S. 41°05'	2.10 mi. S. 41°05'	1.70 mi. S. 41°05'	.20 mi. N 41°00'	1.18 mi. S 41°05'
LONGITUDE		.47 mi. W. 78°20'	.50 mi. W 76°40'	.72 mi. E. 77°55'	1.45 mi. W. 78°40'	.70 mi. W. 78°40'	.47 mi. W 78°40'	1.94 mi. E. 78°45'	1.93 mi. E. 78°45'	1.08 mi. E 78°45'	1.71 mi. E. 78°45'
DATE COMPLETED		1-27-56	8-13-56	6-1-56	4-27-56	10-29-56	6-24-56	11-2-56	6-26-56	3-13-56	5-28-56
ELEVATION		954	1350	1232	1696	1886	1816	1990	1897	1992	1648
TULLY		3595-	2864-	5800-	6327-6468	6615-	6530-	6745-	6447-	6840-6980	6442-6577
ONONDAGA		5160-	4220-4317	6839- 40 Mcf gas at 6863	6968-	7223-	7271-	7622-	7102- chert, 7116-gas	7582-7598 chert, 7598-7657	7087-7151
ORISKANY		5264-	4317-4387	6880-	7030-7041 gas at 7033-35	7285- gas	7360-	7706-7722 500 Mcf. gas	7167-7179 gas, 7170-75	7657-7660	7151- 492 Mcf gas at 7156
SALINA			Salt, 4991-5526								
LOCKPORT											
ALBION	RED MEDINA (GRIMSBY)										
	WHITE MEDINA (WHIRLPOOL)										
QUEENSTON											
TOTAL DEPTH		5334	7220	6885	7068	7335	7370	7726	7195	7707	7172
DEEPEST FORMATION TESTED		Oriskany	Salina	Oriskany	Oriskany	Oriskany	Oriskany	Oriskany	Oriskany	Oriskany	Oriskany
RESULT		Salt water in Oriskany Abandoned	Vernon shale, 6885- Dry	Show of gas in Onondaga	1,212 Mcf. gas after acidizing R.P. 3400 psi	3,400 Mcf gas after frac R.P. 3480 psi	Fraced chert 2,147 Mcf gas R.P. 3800 psi	1,250 Mcf gas after frac R.P. 3680 psi in 4 days	2,700 Mcf gas after frac R.P. 3400 psi in 34 hrs.	35 Mcf gas after frac Dry	2,075 Mcf gas after frac R.P. 3580 psi in 130 hrs

TABLE 1
SHEET 2

SUMMARIZED RECORD OF DEEP WELLS (continued)

COUNTY		Clearfield	Clearfield	Clearfield	Clearfield	Clearfield	Clearfield	Clearfield	Clearfield	Clearfield	Clearfield
MAP NUMBER		11	12	13	14	15	16	17	18	19	20
NAME OF WELL		Hopton 1	Nellie Jammison 1	M L Kirk 1	M L Kirk 2	Kruger 1	Mc Goughey 1	Eva Moore 1	Wm. F Moore 1	Clyde Muth 1	Roy Nelson 1
OPERATOR		John Fox	Fairman Drilling Co.	TW Phillips Gas & Oil Co.	TW Phillips Gas & Oil Co.	John Fox	Fairman Drilling Co	New York State Nat. Gas Corp.	New York State Nat. Gas Corp.	Fairman Drilling Co.	New York State Nat. Gas Corp.
TOWNSHIP		Brady	Brady	Brady	Brady	Brady	Brady	Brady	Brady	Brady	Brady
QUADRANGLE		Penfield 18	Penfield 19	Penfield 20	Penfield 21	Penfield 22	Penfield 23	Penfield 24	Penfield 25	Penfield 26	Penfield 27
LATITUDE		.78 mi. S 41°05'	.70 mi. S. 41°05'	.90 mi. S. 41° 05'	1.08 mi. S 41° 05'	.35 mi. S 41° 05'	2.23 mi. S. 41° 05'	1.68 mi. S. 41° 05'	1.02 mi. S. 41° 05'	2.78 mi. S. 41° 05'	.30 mi. S. 41° 05'
LONGITUDE		1.91 mi. E. 78° 45'	2.00 mi. W. 78° 40'	1.25 mi. W. 78° 40'	1.61 mi. W 78° 40'	1.20 mi. W. 78° 40'	1.10 mi. E. 78° 45'	1.50 mi. E. 78° 45'	1.25 mi. E 78° 45'	1.00 mi. E. 78° 45'	1.23 mi. E. 78° 45'
DATE COMPLETED		9 - 7 - 56	5 - 28 - 56	4 - 12 - 56	8 - 17 - 56	7 - 6 - 56	8 - 15 - 56	12 - 28 - 56	10 - 22 - 56	10 - 5 - 56	9 - 20 - 56
ELEVATION		1623	1839	1692	1721	1901	1791	1663	1724	1661	1479
TULLY		6487 -	6576 -	6321 - 6460	6355 - 6425	6668 -	6536 -	6433 -	6745 - 6913	6370 -	6641 - 6760
ONONDAGA		7279 - 98 Mcf gas in chert	7194 -	7006 - 7067	7017 - 7034 chert, 7034 - 7081 35 Mcf gas at 70[illegible]	7450 -	7186 -	7063 - 118 Mcf gas in chert	7490 - 7500 Lime and chert 7500 - 7555	7058 -	7260 - 7270 Lime and chert 7277 - 7323
ORISKANY			7255 - 7276 gas at 7257	7067 - 7079 432 Mcf gas at 7071	7081 - 7093 29 Mcf gas	7518 -	7255 - 1300 Mcf gas at 7257	7134 - 7153 906 Mcf gas	7555 - S. W at 7559	7119 - 7135 show of gas	7323 - salt water
SALINA											
LOCKPORT											
ALBION	RED MEDINA (GRIMSBY)										
	WHITE MEDINA (WHIRLPOOL)										
QUEENSTON											
TOTAL DEPTH		7344	7285	7088	7094	7537	7273	7154	7569	7136	7336
DEEPEST FORMATION TESTED		Onondaga Chert	Oriskany	Oriskany	Oriskany	Oriskany	Oriskany	Oriskany	Oriskany	Oriskany	Oriskany
RESULT		2600 Mcf gas after frac R.P. 3250 psi.	750 Mcf gas after shot R.P. 3000 psi in 38 hrs.	1,418 Mcf gas after frac R.P. 1400 psi in 16 hrs.	850 Mcf gas after frac	881 Mcf gas after acidizing R.P. 1800 psi with casing leak	5,000 Mcf gas after frac R.P. 3600 psi in 13 hrs.	4191 Mcf gas after frac R.P. 2560 psi in 18 hrs.	Salt water in Oriskany Abandoned	450 Mcf gas after frac R.P. 3300 psi in 3 days	Hole full of salt water before and after frac Abandoned

TABLE I
SHEET 3

SUMMARIZED RECORD OF DEEP WELLS (continued)

COUNTY		Clearfield	Clearfield	Clearfield	Clearfield	Clearfield	Clearfield	Clearfield	Clearfield	Clearfield	Clearfield
MAP NUMBER		21	22	23	24	25	26	27	28	29	30
NAME OF WELL		Ord Oaks 1	Pa Tract 63 1	Reitz 1	Isobell Rowland 1	Harvey H. Seyler 1	Stallman & Simpson 1	Wachob 1	T.B. Wachob 1	Chas Wingard 1	Wm Wingert 1
OPERATOR		T.W. Phillips Gas & Oil Co.	New York State Nat. Gas Corp.	I.H. Hogue	New York State Nat. Gas Corp.	Columbian Carbon Co	Brookville Drilling Co.	John Fox	New York State Nat Gas Corp.	James Drilling Co	T.W. Phillips Gas & Oil Co
TOWNSHIP		Brady	Huston	Brady	Brady	Brady	Brady	Brady	Brady	Brady	Brady
QUADRANGLE		Penfield 28	Penfield 29	Penfield 30	Penfield 31	Penfield 32	Penfield 33	Penfield 34	Penfield 35	Penfield 39	Penfield 38
LATITUDE		.90 mi. S. 41°05′	.77 mi. S. 41°10′	1.52 mi. S. 41°05′	.17 mi. S 41°05′	2.56 mi. S 41°05′	1.34 mi. N. 41°00′	.83 mi. S 41°05′	1.03 mi. S. 41°05′	2.20 mi. S 41°05′	1.50 mi. S. 41°05′
LONGITUDE		1.95 mi. W. 78°40′	.40 mi. E. 78°35′	1.70 mi. E. 78°45′	1.03 mi. W. 78°40′	1.42 mi. W 78°40′	.76 mi. E. 78°45′	1.91 mi. E. 78°45′	2.15 mi. W. 78°40′	1.69 mi. E. 78°45′	1.60 mi. E. 78°45′
DATE COMPLETED		3-8-56	12-12-56	11-23-56	8-3-56	2-24-56	8-24-56	9-7-56	11-28-56	12-13-56	5-28-56
ELEVATION		1911	1911	1701	1657	1949	1633	1698	1683	1800	
TULLY		6590-6720	6650-	6455-	6340-6469	6530-6660	6420-	6512-	6405-	6473-	6460-6580
ONONDAGA		7218-7235 chert, 7235-7284	7282-	7070-	6980-7053	7218- gas at 7233 chert, 7238-	7102- chert, 7112- show of gas in chert	7225-	7010- 90 Mcf gas in chert	7138-	7105-7118 chert, 7118-7166
ORISKANY		7284-7297 946 Mcf gas 7289-7292	7348-7364 660 Mcf gas at 7352	7136-7138 300 Mcf gas	7053-7070 850 Mcf gas at 7056	7292-7300	7170-7175 170 Mcf gas	7288-7308 1500 Mcf gas	7077-7095	7212-7221 100 Mcf gas	7166-7179 1300 Mcf gas
SALINA											
LOCKPORT											
ALBION	RED MEDINA (GRIMSBY)										
	WHITE MEDINA (WHIRLPOOL)										
QUEENSTON											
TOTAL DEPTH		7302	7367	7157	7071	7350	7180	7313	7097	7226	7181
DEEPEST FORMATION TESTED		Oriskany	Oriskany	Oriskany	Oriskany	Oriskany	Oriskany	Oriskany	Oriskany	Oriskany	Oriskany
RESULT		5,500 Mcf gas after frac R.P. 3840 psi in 64 hrs	6,981 Mcf gas after frac R.P. 3840 psi in 68 hrs	880 Mcf gas after frac R.P. 2540 psi in 48 hrs	5,500 Mcf gas after frac R.P. 3770 psi in 48 hrs	chert, 7300-735 60 Mcf gas after frac Abandoned	387 Mcf gas after frac R.P. 3500 psi	2,800 Mcf gas after frac R.P. 3550 psi.	1,720 Mcf gas after frac R.P. 1910 psi in 66 hrs	1,500 Mcf gas after frac R.P. 3520 psi	5,957 Mcf gas after frac

TABLE 1
SHEET 4

SUMMARIZED RECORD OF DEEP WELLS (continued)

COUNTY		Clearfield	Clearfield	Clearfield	Clearfield	Clinton	Clinton	Clinton	Clinton	Crawford	Crawford
MAP NUMBER		31	32	33	34	35	36	37	38	39	40
NAME OF WELL		Pa Tract 42 2	B W Irwin 1	John C. Kann 1	Craig McGee 1	Pa. Tract 14 10	Pa Tract 14 11	Pa Tract 15 9	Pa. Tract 15 10	Griffith 2	Raymond Halfast 1
OPERATOR		Parsons Bros.	F.C Deemer	New York State Nat Gas Corp	F.C Deemer	New York State Nat. Gas Corp	New York State Nat. Gas Corp	New York State Nat Gas Corp	New York State Nat. Gas Corp	Albert Zellsmahn et al	Simpson et al
TOWNSHIP		Goshen	Bell	Bell	Bell	Leidy	Leidy	Chapman	Leidy	Cambridge	Sparta
QUADRANGLE		Clearfield 28	Punxsutawney 12	Punxsutawney 14	Punxsutawney 13	Renovo West 195	Renovo West 196	Renovo West 197	Renovo West 198	Cambridge Springs 5	Corry 25
LATITUDE		2.00 mi. S. 41°15'	1.72 mi. N. 40°55'	1.40 mi. N. 40°55'	2.12 mi. N. 40°55'	1.54 mi. N 41°25'	2.01 mi. N. 41°25'	2.15 mi. S. 41°30'	2.75 mi. N. 41°25'	2.80 mi. N. 41°45'	.15 mi. N. 41°50'
LONGITUDE		1.44 mi. E. 78°25'	1.69 mi. E. 78°50'	1.60 mi. W. 78°45'	.86 mi. W. 78°45'	1.71 mi. W. 77°45'	2.12 mi. W. 77°45'	.30 mi. W. 77°45'	1.28 mi. W. 77°45'	.04 mi. W. 80°05'	.40 mi. E. 79°40'
DATE COMPLETED		11-26-56	8-30-56	10-15-56	2-29-56	9-7-56	10-26-56	6-4-56	12-22-56	7-13-56	11-23-56
ELEVATION		1538	2018	2094	2227	1897	1950	1590	1705	1260	1523
TULLY		5960-6078	6925-7100	6755-6925	7052-7234	6159-	6172-6280	5655-	5960-	2565-	3145-
ONONDAGA		6690-6752	7653-	7469- show gas at 7514	7803-	6986-	7039-	6525-	6849-	2770- chert, 2925-	3392-
ORISKANY		6752- gas at 6756	7745-	7541-7553	7892-7896	7009-7048 gas at 7010	7054-7105	6550-6605 show of gas	6890-6952 36 Mcf gas	2992-2995	sandstone absent
SALINA											
LOCKPORT											
ALBION	RED MEDINA (GRIMSBY)										
	WHITE MEDINA (WHIRLPOOL)										
QUEENSTON											
TOTAL DEPTH		6766	8230	7554	8048	7071	7108	6608	6955	3060	3630
DEEPEST FORMATION TESTED		Oriskany	Oriskany	Oriskany	Oriskany	Oriskany	Oriskany	Oriskany	Oriskany	Oriskany	Helderberg
RESULT		950 Mcf gas after shot R.P. 3700 psi. in 66 hrs.	540 Mcf gas after frac	169 Mcf gas after frac R.P. 2180 psi in 45 hrs.	700 Mcf gas after acidizing and fracing R.P. 3340 psi. in 96 hrs.	750 Mcf gas R.P. 3670 psi. in 92 hrs.	Show of gas R.P. 5½ psi. in 12 days Abandoned	119 Mcf gas after frac R.P. 1660 psi in 64 hrs. Abandoned	12 Mcf gas after shot R.P. 2150 psi in 36 days Abandoned	Dry	Helderberg 3555- Dry

TABLE I
SHEET 6

SUMMARIZED RECORD OF DEEP WELLS (continued)

COUNTY		Crawford	Crawford	Elk	Elk	Elk	Elk	Elk	Elk	Erie	Erie
MAP NUMBER		41	42	43	48	45	46	47	48	49	50
NAME OF WELL		Ed Mullen 1	Robert L. Oates 1	Dents Run Coal Co. 1	Edith Heidrick 1	Edith Heidrick 2	Geo Rupppretch 1	Ross St. John 2	Ross St. John 3	Andrus-Graham 1	Angelotti 1
OPERATOR		Benedum Trees Co.	Mid-Atlantic Oil & Gas Co.	Fairman Drilling Co.	New York State Nat. Gas Corp.	New York State Nat Gas Corp.	Flanigan et al	W. H. Wert et al	W. H. Wert et al	Summit Development Co.	Don Cowan et al
TOWNSHIP		So. Shenango	Conneaut	Benezette	Benezette	Benezette	Benezette	Benezette	Benezette	Summit	Summit
QUADRANGLE		Linesville 13	Linesville 12	Benezette 260	Benezette 261	Benezette 262	Benezette 263	Benezette 264	Benezette 265	Erie 52	Erie 53
LATITUDE		.95 mi. N. 41°30′	.75 mi. N 41° 40′	2.25 mi. N 41° 20′	2.24 mi. S 41°25′	2.05 mi. S 41°25′	2.23 mi. N. 41° 20′	2.62 mi. S 41°25′	2.75 mi. N 41°20′	2.49 mi. S 42°05′	1.94 mi. S 42° 05′
LONGITUDE		.73 mi. W. 80°25′	2.20 mi. E. 80°30′	1.74 mi. W. 78°15′	.77 mi. W. 78°15′	1.25 mi. W 78°15′	1.17 mi. W. 78°15′	1.48 mi. W 78° 15′	1.29 mi W 78°15′	1.41 mi. E 80° 05′	1.79 mi. E. 80°05′
DATE COMPLETED		12 - 7 - 56	8 - 10 - 56	11 - 16 - 56	12 - 14 - 56	10 - 19 - 56	11 - 9 - 56	6 - 7 - 56	12 - 12 - 56	1 - 20 - 56	2 - 3 - 56
ELEVATION		1292	1118	1641	1645	1589	1635	1009	967	1265	1255
TULLY					6116 -	6115 - 6228	6174 -	5510 - 5620	5409 -	1901 -	1890 -
ONONDAGA		3060 - 3225	2495 - 2702	6131 -	6740 -	6748 - 6775 chert 6775-6783	6808 -	6158 -	6033 -	2124 -	2090 -
DRISKANY		3253 - 3288 S.W. at 3264	2702 - 2721 S W rose 2110 ft	6765 -	6775 - 6813 gas	6783 - gas at 6787	6848 - 231 Mcf gas 45 gal. S.W.	6188 - gas at 6193	6064 - 6100 15 Mcf gas at 6064	2368 - gas	2359 - gas at 2365
SALINA			Salt, 2989 - 3014	6792 - show of gas.							
LOCKPORT		4090 - 25 Mcf gas at 4257	3486 - 3702 black water at 3641								
ALBION	RED MEDINA (GRIMSBY)	4501 - 4548	3840 -								
	WHITE MEDINA (WHIRLPOOL)	4673 - 4685	- 4038								
QUEENSTON			4038 -								
TOTAL DEPTH		4735	4088	6837	6815	6793	6878	6195	6108	2383	2368
DEEPEST FORMATION TESTED		Albion	Albion	Oriskany	Oriskany	Oriskany	Oriskany	Oriskany	Oriskany	Oriskany	Oriskany
RESULT		Dry	SW in Oriskany at 2710 Show oil & gas at 3860 Fraced No results	220 Mcf gas after frac blew down to 80 Mcf Abandoned	839 Mcf gas after frac R P 3250 psi in 10 days	2,054 Mcf gas R P 3710 psi in 90 hrs	Gas blew down to 80 Mcf 2½ bailers SW in 12 hrs Abandoned	1,375 Mcf gas R P 3300 psi Discovery Well	327 Mcf gas after frac R P 3300 psi in 8 days	10F 5000 Mcf gas est.	10F 4,000 Mcf gas

TABLE 1
SHEET 8

SUMMARIZED RECORD OF DEEP WELLS (continued)

COUNTY		Erie	Erie	Erie	Erie	Erie	Erie	Erie	Erie	Erie	Erie
MAP NUMBER		51	52	53	54	55	56	57	58	59	60
NAME OF WELL		A. Ardini 1	Beon 1	C.A. Blose 1	Bronokowski 2	Peter Camerlo 1	Peter Camerlo 2	J. Caserta 1	Coleman 1	Danish Lots 1	Dodge 1
OPERATOR		Pa. Gas Co No. 1527	Pa Gas Co	Chas. Seigel	Pitanyak et al	Pa. Gas Co No. 1519	Pa. Gas Co. 1526	Pa. Gas Co. 1515	Art Will	Art Will et al	Vinopal et al
TOWNSHIP		Summit	Summit	Summit	Summit	Summit	Summit	Summit	Summit	Summit	Summit
QUADRANGLE		Erie 54	Erie 55	Erie 56	Erie 57	Erie 58	Erie 59	Erie 60	Erie 61	Erie 63	Erie 98
LATITUDE		2.05 mi. S. 42°05'	2.10 mi. S. 42° 05'	2.60 mi. N. 42°00'	2.12 mi S. 42°05'	2.80 mi. S. 42°05'	2.12 mi. S. 42° 05'	2.20 mi. S. 42°05'	1.97 mi S. 42°05'	1.88 mi. S. 42°05'	1.60 mi. S. 42° 05'
LONGITUDE		.06 mi. E. 80°05'	1.84 mi. E. 80°05'	1.79 mi. E 80°05'	1.21 mi. E. 42°05'	.17 mi. E. 80°05'	.35 mi. E. 80°05'	1.68 mi. E. 80°05'	1.61 mi. E. 80°05'	1.58 mi. E. 80° 05'	1.23 mi. E. 80° 05'
DATE COMPLETED		9 - 7 - 56	7 - 6 - 56	11 - 2 - 56	9 - 12 - 56	3 - 30 - 56	8 - 31 - 56	1 - 13 - 56	3 - 5 - 56	1 - 6 - 56	6 - 1 - 56
ELEVATION		1180	1268	1065	1224	1220	1205	1256	1217	1257	1176
TULLY		1809 - 1908	1904 -	1710 -	1841 -	1872 -	1832 - 1904	1894 - 1997	1850 -	1915 -	1830 -
ONONDAGA		2033 -	2132 -	1940 -	2065 -	2074 -	2062 -	2120 -	2074 -	2117 -	2046 -
ORISKANY		2277 - gas	2376 - gas at 2382	2222 - 2245 salt water	2313 - gas	2323 - gas	2309 - gas at 2314	2362 - gas	2326 ? -	sandstone absent	2298 - 2318 S.W at 2305
SALINA											
LOCKPORT											
ALBION	RED MEDINA (GRIMSBY)										
	WHITE MEDINA (WHIRLPOOL)										
QUEENSTON											
TOTAL DEPTH		2287	2387	3082	2327	2332	2319	2372	2334	2395	2330
DEEPEST FORMATION TESTED		Oriskany	Oriskany	Oriskany	Oriskany	Oriskany	Oriskany	Oriskany	Oriskany	Oriskany horizon	Oriskany
RESULT		10F 30,000 Mcf gas R.P. 690 psi in 24 hrs	10F 4,699 Mcf gas	Salt water in Oriskany Abandoned	10F 3,465 Mcf gas	10F 17,008 Mcf gas R.P. 722 psi in 24 hrs	10F 16,983 Mcf gas	10F 6,400 Mcf gas R.P. 775 psi in 17½ hrs.	10F 9,192 Mcf gas	Salt water at 2390 Abandoned	Salt water in Oriskany Abandoned

TABLE I
SHEET 7

SUMMARIZED RECORD OF DEEP WELLS (continued)

COUNTY		Erie	Erie	Erie	Erie	Erie	Erie	Erie	Erie	Erie	Erie
MAP NUMBER		61	62	63	64	65	66	67	68	69	70
NAME OF WELL		Dolak 2	Eller 1	A. Engell 1	A. Engell 2	Henry Faerber 1	T. Fagan	O. Farnen 1	H. Finch 1	Finchio 1	Goodwill-Curley 1
OPERATOR		Chas Siegel et al	Vinopal et al	Pa. Gas Co. No. 1514	Pa. Gas Co. No 1517	Weaver Bros	J. Pitonyak	Pa. Gas Co. No. 1521	Flanigan et al	Pa. Gas Co. No. 1522	Stephens et al
TOWNSHIP		Summit	Summit	Summit	Summit	Summit	Summit	Summit	Summit	Summit	Summit
QUADRANGLE		Erie 64	Erie 65	Erie 66	Erie 67	Erie 68	Erie 70	Erie 71	Erie 72	Erie 73	Erie 62
LATITUDE		2.08 mi. S. 42°05'	1.87 mi. S 42°05'	2.40 mi. S. 42°05'	2.31 mi. S 42°05'	1.32 mi. S 42°05'	2.44 mi. S. 42°05'	2.61 mi. S 42°05'	2.59 mi. S. 42°05'	2.57 mi. S 42°05'	2.53 mi. S. 42°05'
LONGITUDE		.92 mi. E. 80°05'	1.22 mi. E. 80°05'	1.52 mi. E 80°05	1.45 mi. E. 80°05'	1.52 mi. E. 80°05'	.27 mi. E. 80°05'	.80 mi. E. 80°05'	.10 mi. E. 80°05'	1.58 mi. E 80°05'	1.25 mi. W 80°00'
DATE COMPLETED		1-27-56	4-27-56	1-20-56	2-24-56	3-29-56	11-2-56	4-27-56	3-16-56	5-11-56	9-28-56
ELEVATION		1211	1200	1252	1249	1162	1238	1269	1240	1282	1240
TULLY		1852 -	1846 -	1886-1979	1877 -	1773 -	1880 -	1906 -	1897 -	1916 -	1879 -
ONONDAGA		2074 -	2076 -	2116 -	2105 -	2000 -	2100 -	2130 -	2128 -	2141 -	2111 -
ORISKANY		2319 - gas at 2327	2324 - S W at 2332	2364-2389 25 Mcf gas show of oil, SW	2349 - gas	2265 - SW at 2271	2347 - gas	2380 - gas, SW at 2387	2388 - S.W at 2399	2381 - gas	2353 - 1660 cu ft. gas at 2369 1200 ft SW at 2380
SALINA											
LOCKPORT											30 Mcf gas at 3106-3110 Black water at 3117
ALBION	RED MEDINA (GRIMSBY)										horizon 3334 -
	WHITE MEDINA (WHIRLPOOL)										3440-3453 109 Mcf gas at 3447
QUEENSTON											3453-4377
TOTAL DEPTH		2329	2332	2390	2359	2271	2358	2397	2400	2390	6015
DEEPEST FORMATION TESTED		Oriskany	Oriskany	Oriskany	Oriskany	Oriskany	Oriskany	Oriskany	Oriskany	Oriskany	Gatesburg
RESULT		10F 12,448 Mcf gas	Salt water in Oriskany Abandoned	Show of oil, show of gas ½ bailer SW in Oriskany Abandoned	10F 5,800 Mcf gas	Salt water in Oriskany Abandoned	10F 8,000 Mcf gas	10F 1650 Mcf gas salt water	Salt water in Oriskany Abandoned	10F 13,131 Mcf gas R P 686 psi in 24 hrs	Reedsville, 4377- Trenton, 5176-5876 Gatesburg, 5969-5993 20 Mcf gas 1785 ft. SW. at 6015

TABLE I
SHEET 8

SUMMARIZED RECORD OF DEEP WELLS (continued)

COUNTY		Erie	Erie	Erie	Erie	Erie	Erie	Erie	Erie	Erie	Erie
MAP NUMBER		71	72	73	74	75	76	77	78	79	80
NAME OF WELL		Havern 1	G. Hermon 1	Kanyar 1	Karaski 1	Roger Kerr 1	F Korrell 1	J Kuzma 1	E. Mehl 1	Niederriter 1	R. Nick 1
OPERATOR		J Pitonyak	Summit Oil & Gas Co.	Pa. Gas Co No. 1523	Crist Co	Amity Oil & Gas Co.	Art Will et al	Pa. Gas Co. No. 1513	Flanigan et al	H.D. Brown et al	Harold Crist et al
TOWNSHIP		Summit	Summit	Summit	Summit	Summit	M^c Kean	Summit	Summit	Summit	Summit
QUADRANGLE		Erie 74	Erie 100	Erie 75	Erie 76	Erie 77	Erie 78	Erie 79	Erie 80	Erie 81	Erie 82
LATITUDE		2.42 mi. S 42°05'	.59 mi. N 42°00'	2.65 mi. S. 42°05'	2.82 mi. S. 42°05'	2.40 mi. S 42°05'	2.60 mi. N 42°00'	2.60 mi. S 42°05'	2.04 mi. S. 42°05'	1.43 mi. S 42°05'	2.45 mi. S 42°05'
LONGITUDE		.20 mi. E. 80°05'	2.06 mi. W. 80°00'	1.80 mi. E 80°05'	.35 mi. E. 80°05'	1.21 mi. E 80°05'	1.05 mi. E. 80°10'	1.94 mi. E. 80°05'	1.65 mi. E. 80°05'	.58 mi. E. 80°05'	1.07 mi. E. 80°05'
DATE COMPLETED		5 - 11-56	8 - 31-56	6 - 1 - 56	10 - 19 - 56	2 - 6 - 56	10 - 26 - 56	2 - 8 - 56	2 - 24-56	6 - 29 - 56	4 - 20 - 56
ELEVATION		1237	1439	1271	1285	1255	1033	1292	1238	1033	1274
TULLY		1880 -	2130 -	1913 -	1922 - 2012			1940 - 2035	1867 -	1762 -	1911 -
ONONDAGA		2084 -		2144 -	2144 -	2118 -		2156 -	2094 -	1995 -	2144 -
ORISKANY		2344 - gas at 2351	2612 -	2380 - gas	2397 - gas	2357 - gas	2168 - S.W at 2170	2400 - gas	2339 - gas	2244 - S.W at 2252	2389 - gas at 2392
SALINA											
LOCKPORT											
ALBION	RED MEDINA (GRIMSBY)										
	WHITE MEDINA (WHIRLPOOL)										
QUEENSTON											
TOTAL DEPTH		2355	2618	2391	2405	2373	2175	2410	2350	2251	2393
DEEPEST FORMATION TESTED		Oriskany	Oriskany	Oriskany	Oriskany	Oriskany	Oriskany	Oriskany	Oriskany	Oriskany	Oriskany
RESULT		1OF. 4,817 Mcf gas R.P. 725 psi in 40 hrs.	Show of gas and salt water Abandoned	1OF. 5,252 Mcf gas R.P 680 psi in 42 hrs.	1OF. 9,822 Mcf gas R.P. 685 psi in 15 hrs.	1OF. 9,055 Mcf gas	Salt water in Oriskany Abandoned	1OF. 6,391 Mcf gas	1OF. 9,192 Mcf gas R.P. 726 psi in 24 hrs.	Show of gas, oil, salt water in Oriskany Abandoned	1OF. 2,193 Mcf gas

TABLE I
SHEET 9

SUMMARIZED RECORD OF DEEP WELLS (continued)

COUNTY		Erie	Erie	Erie	Erie	Erie	Erie	Erie	Erie	Erie	Erie
MAP NUMBER		81	82	83	84	85	89	87	84	89	90
NAME OF WELL		Procter 1	T Renderlie 1	King Robinson 2	King Robinson 3	C. Rubin 1	Schlindwein 1	Schlindwein 1	J. Schuster 1	E. Straub 1	P. Stocklok 1
OPERATOR		Wm. Gettman	Stevenson Dev. Co.	Pa. Gas Co. 1518	Pa. Gas Co. 1528	Weaver Bros	N.A.P.A. Corp.	Weaver Bros.	Flanigan et al	N.A.P.A. Corp	Erico Drilling Co
TOWNSHIP		Summit	Summit	Summit	Summit	Summit	Summit	Summit	Summit	Summit	Summit
QUADRANGLE		Erie 99	Erie 83	Erie 96	Erie 97	Erie 84	Erie 85	Erie 86	Erie 87	Erie 88	Erie 89
LATITUDE		1.69 mi. S. 42°05'	2.00 mi. S 42°05'	2.51 mi S 42°05'	2.54 mi S. 42°05'	1.65 mi. S 42°05'	2.75 mi S 42°05'	2.50 mi. S 42°05'	1.87 mi. S. 42°05'	1.82 mi S 42°05'	2.07 mi. S. 42°05'
LONGITUDE		1.97 mi. E. 80°05'	.29 mi. E. 80°05'	.51 mi. E. 80°05'	.76 mi. E. 80°05'	1.77 mi. E 80°05'	1.05 mi. E. 80°05'	.90 mi. E. 80°05'	1.33 mi. E. 80°05'	2.08 mi. E 80°05'	1.98 mi. E. 80°05'
DATE COMPLETED		11-23-56	7-6-56	3-30-56	11-9-56	10-29-56	7-27-56	6-22-56	3-29-56	1-1-56	4-2-56
ELEVATION		1247	1197	1269	1275	1258	1300	1267		1265	1283
TULLY		1900-	1826-1910	1905-	1908-	1910-	1935-	1905-	1857-	1920-	1921-
ONONDAGA		2137-	2045-	2124-	2130-	2143-	2153-	2123-	2089-	2147-	2144-
ORISKANY		2377- S.W. at 2387	2290- gas	2376- gas	2378- gas	2374- S.W. 2381-2386	2395- gas	2365- gas	2329- S.W. at 2339		2389- gas
SALINA											
LOCKPORT											
ALBION	RED MEDINA (GRIMSBY)										
	WHITE MEDINA (WHIRLPOOL)										
QUEENSTON											
TOTAL DEPTH		2390	2300	2389	2391	2386	2413	2376	2339	2397	2400
DEEPEST FORMATION TESTED		Oriskany	Oriskany	Oriskany	Oriskany	Oriskany	Oriskany	Oriskany	Oriskany	Oriskany	Oriskany
RESULT		Salt water in Oriskany Abandoned	10F 8,505 Mcf gas	10F 1,221 Mcf gas	10F 10,217 Mcf gas R.P. 665 psi in 23 hrs	1200 ft of salt water Abandoned	10F 11,000 Mcf gas	10F 10,416 Mcf gas R.P. 696 psi in 17½ hrs	Salt water in Oriskany Abandoned	10F 1,500 Mcf gas	10F 5,252 Mcf gas

TABLE I
SHEET 10

SUMMARIZED RECORD OF DEEP WELLS (continued)

COUNTY		Erie	Erie	Erie	Erie	Erie	Erie	Erie	Erie	Erie	Erie
MAP NUMBER		91	92	93	94	95	96	97	98	99	100
NAME OF WELL		J. Taft 1	F. Vetter 2	F. Vetter 3	F. Weinman 1	Harry Will 2	C. Wolfe 1	Zimmerly 1	Evans 1	J. Thompson 1	Truesdail 1
OPERATOR		Erico Drilling Co.	Flanigan et al	Ryan, Flanigan et al	N. A. P. A Corp.	Vinopol et al	J. Pitonyak et al	H. D. Brown et al	Olson et al	G. E. Olson et al	Geo. Schrack
TOWNSHIP		Summit	Summit	Summit	Summit	Summit	Summit	Summit	Venango	Venango	Venango
QUADRANGLE		Erie 90	Erie 92	Erie 91	Erie 93	Erie 94	Erie 69	Erie 95	North East 15	North East 12	North East 13
LATITUDE		2.10 mi. S. 42°05'	2.37 mi. S. 42°05'	2.45 mi. S 42°05'	1.70 mi. S. 42°05'	2.20 mi. S 42°05'	2.45 mi. S. 42°05'	2.25 mi. S 42°05'	2.73 mi. N. 42°00'	2.80 mi. N. 42°00'	.90 mi. N. 42°00'
LONGITUDE		1.28 mi. E. 80°05'	.26 mi. E. 80°05'	.32 mi. E. 80°05'	1.95 mi. W 80°00'	.61 mi. E. 80°05'	.19 mi. E. 80°05'	1.35 mi. W. 80°05'	1.62 mi. E. 79°55'	1.43 mi. E. 79°55'	1.45 mi. W. 79°50'
DATE COMPLETED		4-2-56	1-20-56	8-24-56	5-11-56	1-27-56	7-17-56	10-29-56	12-7-56	7-17-56	6-29-56
ELEVATION		1225		1237	1246	1215	1251	1027	1503	1491	1510
TULLY		1855 –		1872 –	1898 –	1847 –	1888 –	1673 –	2292 –	2267 –	2390–2438
ONONDAGA		2077 –	2085 –	2096 –	2113 –	2066 – Oil, 2220-2250	2110 –	1901 –	2524 –	2494 –	2629–2875
ORISKANY		2317 – gas	2335 – gas	2342 – gas	2363 – gas	2311 – gas	2357 – gas	2172 – 2195 SW. at 2179	2762 – 2767	2738 – 2744 gas	sandstone absent
SALINA											Salt, 3301 – 3½ bailers SW. at 3310
LOCKPORT											
ALBION	RED MEDINA (GRIMSBY)							3049 – 3056			
	WHITE MEDINA (WHIRLPOOL)							3186 –			
QUEENSTON								3196 –			
TOTAL DEPTH		2329	2340	2350	2374	2323	2368	3233	2796	2768	3560
DEEPEST FORMATION TESTED		Oriskany	Oriskany	Oriskany	Oriskany	Oriskany	Oriskany	Albion	Oriskany	Oriskany	Salina
RESULT		IOF 5,250 Mcf gas	IOF 10,000 Mcf gas R.P. 780 psi. in 4 min.	IOF 8,217 Mcf gas	IOF 956 Mcf gas R.P. 695 psi in 5 hrs.	IOF 17,603 Mcf gas I.P. 5 bbls oil per day against a R.P. of 665 psi.	IOF 1,056 Mcf gas	Salt water in Oriskany show of gas in Red Medina	Dry	IOF 399 Mcf gas R.P. 745 psi in 20 hrs.	Salt water in Salina Abandoned

TABLE I
SHEET II

SUMMARIZED RECORD OF DEEP WELLS (continued)

COUNTY		Erie	Erie	Indiana	Indiana	Indiana	Indiana	Indiana	Indiana	Indiana	Jefferson
MAP NUMBER		101	102	103	104	105	106	107	108	109	110
NAME OF WELL		Carl Winkleman 1	J C Jacobson 1	Farmers & Miners Trust Co B1	Florence Boden et al 1	Eliz. Carney 1	L. Neal 3	G.L. Stewart-R & P Coal Co. 1	Susie Yasurack 1	Isaac R Smith 1	H.C McClure 2
OPERATOR		E.W Ewing	C. Williams et al	Columbian Carbon Co.	New York State Nat. Gas Corp	Peoples Nat. Gas Co.	T.W. Phillips Gas & Oil Co	Manufacturers Light & Heat Co	Columbian Carbon Co.	Columbian Carbon Co.	Columbian Carbon Co.
TOWNSHIP		Greene	Girard	Banks	Young	Armstrong	Young	Young	Armstrong	Brush Valley	Gaskill
QUADRANGLE		North East 14	Girard 21	Punxsutawney 22	Elders Ridge 1	Elders Ridge 2	Elders Ridge 4	Elders Ridge 3	Indiana 2	New Florence 5	Punxsutawney 17
LATITUDE		2.72 mi. N 42°00'	.08 mi S. 42°00'	1.17 mi. S 40°55'	1.39 mi. S 40°35'	.28 mi S. 40°35'	.75 mi. S. 40°35'	1.00 mi S. 40°35'	2.80 mi N 40°35'	1.30 mi. S. 40°30'	1.89 mi. N. 40°55'
LONGITUDE		1.59 mi W 79°55'	.50 mi. E 80° 20'	.28 mi. W 78° 50'	2.00 mi E. 79°20'	1.70 mi. W. 79°15'	2.08 mi. E. 79° 20'	2.05 mi E. 79°20'	.10 mi. E. 79°15'	1.25 mi. W. 79°00'	.60 mi. E 78°50'
DATE COMPLETED		2-17-56	7-26-56	6-2-56	12-24-56	11-17-56	12-20-56	9-21-56	10-10-56	9-30-56	7-11-56
ELEVATION		1298	709	1850	1167	1339	1233	1212	1296	1415	1748
TULLY		2061- 2153	1251-	6700-	6710-	6878-	6760-6800	6764-6881	7085-7185	6885-	6565-6748
ONONDAGA		2284-	1447-	7387-7397 chert, 7397-	7327- chert, 7343-	7428- chert, 7445- gas	7398-7415 chert, 7415-7560 2800 Mcf gas	7306- chert 7322- show of gas at 7427	7618-7632 chert 7632-7757	7575-7601 chert, 7601-7708	7282-7299 chert, 7299-7362 gas
ORISKANY		2533- S.W at 2533	1721- salt water	7472-7476	7491-7519 Show gas at 7495	7562-7582 gas	7560-7583	7456-7477	7757-7787 show of gas at 7759	7708-7746 show of gas	7362-7370 gas
SALINA											
LOCKPORT											
ALBION	RED MEDINA (GRIMSBY)										
	WHITE MEDINA (WHIRLPOOL)										
QUEENSTON											
TOTAL DEPTH		2537	1723	7528	7566	7585	7585	7489	7802	7754	7400
DEEPEST FORMATION TESTED		Oriskany	Oriskany	Oriskany	Oriskany	Oriskany	Oriskany	Oriskany	Oriskany	Oriskany	Oriskany
RESULT		1000 ft. S.W. in Oriskany Abandoned	1200 ft S.W in Oriskany Abandoned	1,586 Mcf gas after frac R.P. 3500 psi in 6 days	348 Mcf gas after frac R.P. 3150 psi in 52 hrs.	2,000 Mcf gas in shallow sand 2,214 Mcf gas in chert and Oriskany R.P. 4350 psi in 40 hrs.	3,600 Mcf gas after frac.	9,000 Mcf gas after frac R.P. 4230 psi in 45 hrs Discovery Well	3,610 Mcf gas after frac R.P. 3950 psi in 18 hrs.	1,540 Mcf gas after frac R.P. 4250 psi in 72 hrs	1,812 Mcf gas after frac R.P. 3650 psi in 4 days

TABLE 1
SHEET 12

SUMMARIZED RECORD OF DEEP WELLS (continued)

COUNTY		Jefferson	Jefferson	Jefferson	Lackawanna	Lawrence	Lycoming	McKean	Mercer	Potter	Potter
MAP NUMBER		111	112	113	114	115	116	117	118	119	120
NAME OF WELL		Nolph 1	Punxsutawney Beef & Prov. Co 1	Frank M. Sheesley 1	L. R. Richards 1	J. A. Book 1	Frank Tranor 1	Al Nolan 1	E. McKnight 1	Chase 1	Ocea O. Britton 2 (HW-51)
OPERATOR		Fairman Drilling Co	New York State Nat Gas Corp	Columbian Carbon Co	Transcontinental Production Co	T. W. Phillips Gas & Oil Co	Tranor et al	Jack Shuman et al	Melben Oil Co	Hanley & Bird	New York State Nat Gas Corp
TOWNSHIP		Gaskill	Gaskill	Gaskill	Ransom	Slippery Rock	Jordan	Ceres	Pymatuning	Hector	Harrison
QUADRANGLE		Punxsutawney 18	Punxsutawney 19	Punxsutawney 20	Pittston 1	Zelienople 6	La Porte 1	Coudersport 67	Shenango 5	Gaines 87	Gaines 90
LATITUDE		1.51 mi. N. 40° 55'	1.15 mi. N. 40° 55'	.65 mi. N. 40° 55'	.20 mi. S. 41° 25'	.40 mi. S. 41° 00'	1.42 mi. N. 41° 15'	.25 mi. S 41° 55'	.90 mi. S. 41° 20'	.51 mi. S. 41° 50'	1.00 mi. S. 42° 00'
LONGITUDE		.80 mi. E. 78° 50'	2.20 mi. E. 78° 55'	.50 mi. W. 78° 50'	.45 mi. E. 75° 50'	1.25 mi. E. 80° 15'	.80 mi. E. 76° 30'	2.08 mi. W 78° 10'	2.00 mi. E. 80° 30'	1.23 mi. E. 77° 40'	.06 mi. E 77° 40'
DATE COMPLETED		8-14-56	10-6-56	9-22-56	11-21-56	6-22-56	9-7-56	10-26-56	10-15-56	5-11-56	6-1-56
ELEVATION		1732	1704	1874	1030	1173	1320	1871	950	1788	2073
TULLY		6558-	6852-7015	6740-6950	5235-	4284-4310		4412-4449	horizon 2950-	4242-	4240-
ONONDAGA		7351- show of gas at 7396	7515-7539 chert, 7539-7607	7426-7442 chert, 7442-7508	7448-	4450-4620		4911-	3050-3250	5022-5030	4903-
ORISKANY			7607-7625	7518-7526	sandstone absent	4620-4635 show of gas 4622		horizon 4968-	3250-3269	5030-5036	4937- gas
SALINA									3390-4269		
LOCKPORT									4269-4530 show of oil Clinton, 4560-4675		
ALBION	RED MEDINA (GRIMSBY)								4680-4750		
	WHITE MEDINA (WHIRLPOOL)								4843-4861		
QUEENSTON									4861-5720		
TOTAL DEPTH		7460	7630	7551	8618	4850	7169	5000	8210	5102	4962
DEEPEST FORMATION TESTED		Oriskany	Oriskany	Oriskany	Helderberg	Helderberg	?	Oriskany	Gatesburg	Oriskany	Oriskany
RESULT		80 Mcf gas after frac Abandoned	Helderberg, 7625 1 bailer S.W. per hr at 7625 Abandoned	3,860 Mcf gas after frac R.P. 4000 psi	100 Mcf gas at 2814 Helderberg, 8579- Plugged back for shallow gas	Helderberg, 4635- show of gas at 4637 No increase in gas after frac 5 gals S.W. in 5½ hr at 4625 Abandoned		Dry	Utica shale 6545- Trenton, 6832-74 €O Dol, 7422-7522 Gatesburg, 7522- € Dol. 7765-8135 shale, 8135-821 Abandoned	Dry	Gas Storage Well

TABLE I
SHEET 13

SUMMARIZED RECORD OF DEEP WELLS (continued)

COUNTY		Potter	Potter	Potter	Potter	Potter	Potter	Potter	Potter	Potter	Potter
MAP NUMBER		121	122	123	124	125	126	127	128	129	130
NAME OF WELL		Archie Converse 2 (HW-50)	Datus Lewis 2 (HW-46)	Datus Lewis 3 (HW-47)	F. Lewellyn 2 (HW-49)	H. McCutcheon 1 (HW-56)	Miller 1 (HW-44)	William Nye 1 (HW-43)	Fred Plaisted 1 (HW-45)	Fred Plaisted 2 (HW-55)	L. Schofield 3 (HW-52)
OPERATOR		New York State Nat. Gas Corp.	New York State Nat. Gas Corp.	New York State Nat. Gas Corp.	New York State Nat. Gas Corp.	New York State Nat. Gas Corp.	New York State Nat. Gas Corp.	New York State Nat. Gas Corp.	New York State Nat. Gas Corp.	New York State Nat. Gas Corp.	New York State Nat. Gas Corp.
TOWNSHIP		Harrison	Harrison	Harrison	Harrison	Harrison	Harrison	Harrison	Harrison	Harrison	Harrison
QUADRANGLE		Gaines 91	Gaines 92	Gaines 93	Gaines 94	Gaines 95	Gaines 86	Gaines 69	Gaines 96	Gaines 97	Gaines 98
LATITUDE		2.78 mi. S 42°00'	2.08 mi. S. 42°00'	2.42 mi. S. 42°00'	.99 mi. S 42°00'	.72 mi. S 42°00'	2.92 mi. S 42°00'	.51 mi. S 42°00'	2.52 mi. S 42°00'	1.50 mi. S. 42°00'	1.86 mi. S 42°00'
LONGITUDE		2.20 mi. W 77°40'	.40 mi. W 77°40'	.51 mi. W 77°40'	.74 mi. W 77°40'	.44 mi. E. 77°40'	1.67 mi. W. 77°40'	1.21 mi. W 77°40'	1.68 mi. W. 77°40'	2.06 mi. W. 77°40'	.96 mi. W 77°40'
DATE COMPLETED		6-8-56	3-6-56	4-27-56	4-27-56	10-25-56	3-26-56	2-29-56	1-30-56	9-25-56	7-2-56
ELEVATION		1942	2024	2195	2056	2121	1861	2245	1941	2230	2129
TULLY		4128-	4174-	4444-	4242-	4291-	4062-	4524-	4088-	4456-	4290-
ONONDAGA		4774-	4834-	5899-	4903-	4958-	4837-	5187-	4749-	5111-	4954-
ORISKANY		4810- gas	4860- gas at 4874	5975-	4930- gas	4990- gas	4872- salt water	5219-5250 9 gals. SW per hr. at 5234	4778- gas	5141- gas at 5146	4986- 3,052 Mcf gas
SALINA											
LOCKPORT											
ALBION	RED MEDINA (GRIMSBY)										
	WHITE MEDINA (WHIRLPOOL)										
QUEENSTON											
TOTAL DEPTH		4836	4885	5992	4955	5015	4879	5260	4803	5170	5102
DEEPEST FORMATION TESTED		Oriskany	Oriskany	Oriskany	Oriskany	Oriskany	Oriskany	Oriskany	Oriskany	Oriskany	Oriskany
RESULT		Gas Storage Well	Gas Storage Well	Drilled for gas storage Dry	Gas Storage Well	Gas Storage Well	2400 ft. S.W. Drilled for gas storage Abandoned	Gas Storage Well	Gas Storage Well	Gas Storage Well	Gas Storage Well

TABLE I
SHEET 14

SUMMARIZED RECORD OF DEEP WELLS (continued)

COUNTY		Potter	Potter	Potter	Potter	Potter	Potter	Snyder	Tioga	Tioga	Tioga
MAP NUMBER		131	132	133	134	135	136	137	138	139	140
NAME OF WELL		Benj. E. Truox 1 (HW-57)	J. F. Williams (HW-53)	Pa. Tract 45 2	Pa. Tract 45 3	Pa. Tract 58 2	Pa. Tract 16 9	Albert 1	Vera Vanderhoff 3	Frank S. Burdick 1	Mark J. Robert
OPERATOR		New York State Nat. Gas Corp.	New York State Nat. Gas Corp.	New York State Nat. Gas Corp	New York State Nat. Gas Corp	New York State Nat. Gas. Corp	New York State Nat. Gas Corp	Middle Creek Valley Pros. Co.	New York State Nat. Gas Corp	New York State Nat. Gas Corp	New York State Nat. Gas Corp
TOWNSHIP		Harrison	Harrison	Stewardson	Stewardson	Stewardson	Stewardson	Adams	Clymer	Clymer	Clymer
QUADRANGLE		Gaines 89	Gaines 88	Galeton 21	Galeton 23	Galeton 22	Renovo East 13	Mifflinburg 3	Gaines 101	Gaines 99	Gaines 100
LATITUDE		.25 mi. S. 42°00'	.68 mi. S 42°00'	.50 mi. N. 41°30'	.87 mi. N 41°30'	.25 mi. N. 41°30'	.65 mi. S. 41°30'	1.74 mi. S. 40°50'	1.08 mi. N 41°50'	2.50 mi. S 41°55'	1.76 mi. N. 41°50'
LONGITUDE		2.39 mi. W. 77°35'	.38 mi. W. 77°40'	1.44 mi. W. 77°40'	1.35 mi. W. 77°40'	.83 mi. W. 77°40'	1.36 mi. E. 77°45'	.44 mi. E 77°10'	.60 mi. E. 77°35'	.77 mi. W 77°30'	2.50 mi. W. 77°30'
DATE COMPLETED		11-26-56	7-30-56	2-8-56	8-7-56	10-15-56	4-27-56	6-29-56	5-2-56	10-4-56	10-26-56
ELEVATION		1893	2135	1795	1846	1717	1568	652	1980	1919	1889
TULLY		4168-4220	4341-4400	5657-5746	5740-	5668-5757	5548-5640		3949-	3860-	3697-
ONONDAGA		5037-5094	5010-5044	6500-6520	6677-	6544-6566	6410-6432	1358-1573	4775-	4627-	4450-
ORISKANY		5094-5125 SW at 5106	5044- gas, 5049-5061	6520- gas at 6525	6697- gas	6566-6616 gas, 6570-6571	6432-6482 1,553 Mcf gas		4784-4806 gas	4640- gas at 4643	4467- gas
SALINA								2143-4670 faulting?			
LOCKPORT								McKenzie 4670-4856? Clinton, 4856-			
ALBION	RED MEDINA (GRIMSBY)										
	WHITE MEDINA (WHIRLPOOL)										
QUEENSTON											
TOTAL DEPTH		5126	5070	6528	6736	6619	6485	5965	4810	4656	4476
DEEPEST FORMATION TESTED		Oriskany	Oriskany	Oriskany	Oriskany	Oriskany	Oriskany	Clinton (Rose Hill)	Oriskany	Oriskany	Oriskany
RESULT		SW in Oriskany 10 gal. SW per hr Drilled for gas storage Abandoned	Gas Storage Well	10F 87,000 Mcf gas R.P. 2000 psi. in 10 days	10F 5,497 Mcf gas R.P. 1160 psi in 37 hrs	146 Mcf gas after frac R.P. 3880 psi in 6 days 1 gal. S.W. per hr.	1,594 Mcf gas after shot R.P. 1600 psi in 15 hrs.	Shriver? and Helderberg (limestone, shale and chert) 1584-1964	Gas Storage Well	Gas Storage Well	Gas Storage Well

TABLE I
SHEET 15

SUMMARIZED RECORD OF DEEP WELLS

COUNTY		Tioga	Wayne	Westmoreland							
MAP NUMBER		141	142	143							
NAME OF WELL		Earl West 1	Simon Haas 1	J G Mailey 1							
OPERATOR		Benedum Trees Co	Penn York Drilling Co	The Peoples Nat Gas Co							
TOWNSHIP		Delmar	Scott	Mt Pleasant							
QUADRANGLE		Antrim 11	Starrucca 1	Donegal 8							
LATITUDE		.35 mi. S 41°40'	.67 mi. S. 42°00'	2.21 mi. N 40°10'							
LONGITUDE		.75 mi. E. 77°25'	.40 mi. W. 75°20'	.81 mi. E. 79°25'							
DATE COMPLETED		7-27-56	8-11-56	9-13-56							
ELEVATION		1770	965	1879							
TULLY		4681-	3167-?	6633-							
ONONDAGA		5610-5633		7233- chert 7253- 162 Mcf gas							
ORISKANY		5633-5653		7407-7473							
SALINA											
LOCKPORT											
ALBION	RED MEDINA (GRIMSBY)										
	WHITE MEDINA (WHIRLPOOL)										
QUEENSTON											
TOTAL DEPTH		5760	5404	7478							
DEEPEST FORMATION TESTED		Oriskany	Tully	Oriskany							
RESULT		Dry	Show of gas at 5350 Abandoned above Onondaga	11,000 Mcf gas after frac R P 4100 psi in 48 hrs Discovery Well							

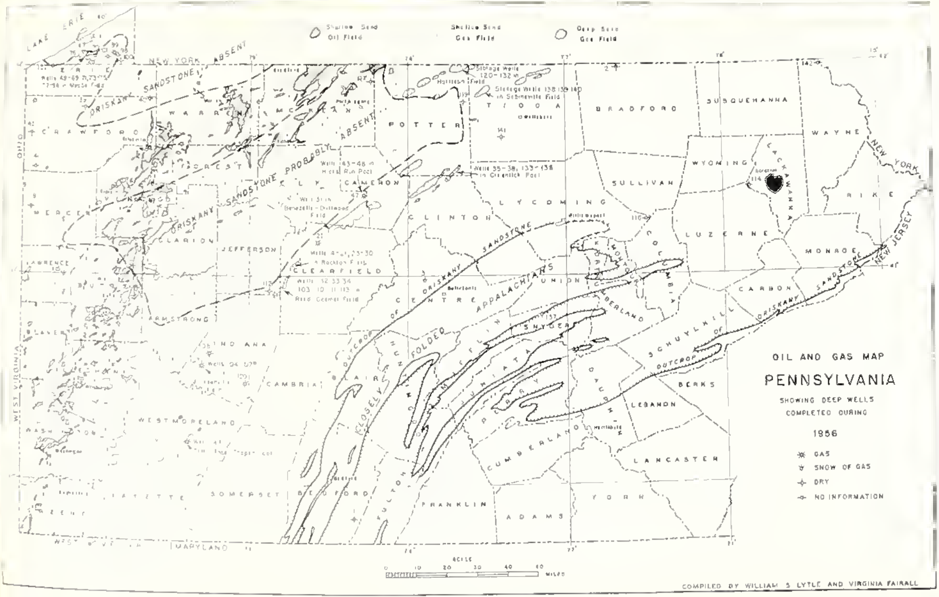Shallow Sand Oil Field
Shallow Sand Gas Field
Deep Sand Gas Field
OIL AND GAS MAP
PENNSYLVANIA
SHOWING DEEP WELLS COMPLETED DURING
1956
GAS
SHOW OF GAS
DRY
NO INFORMATION
LAKE ERIE
NEW YORK
OHIO
WEST VIRGINIA
MARYLAND
NEW JERSEY
ORISKANY SANDSTONE ABSENT
ORISKANY SANDSTONE PROBABLY ABSENT
OUTCROP OF ORISKANY SANDSTONE
CLOSELY FOLDED APPALACHIANS
ERIE
CRAWFORD
WARREN
McKEAN
POTTER
TIOGA
BRADFORD
SUSQUEHANNA
WAYNE
PIKE
WYOMING
LACKAWANNA
SULLIVAN
LUZERNE
MONROE
CARBON
MERCER
VENANGO
FOREST
ELK
CAMERON
CLINTON
LYCOMING
COLUMBIA
MONTOUR
NORTHUMBERLAND
UNION
SNYDER
SCHUYLKILL
LAWRENCE
BUTLER
CLARION
JEFFERSON
CLEARFIELD
CENTRE
MIFFLIN
JUNIATA
PERRY
DAUPHIN
LEBANON
BERKS
BEAVER
ARMSTRONG
INDIANA
CAMBRIA
BLAIR
HUNTINGDON
ALLEGHENY
WESTMORELAND
WASHINGTON
GREENE
FAYETTE
SOMERSET
BEDFORD
FULTON
FRANKLIN
CUMBERLAND
ADAMS
YORK
LANCASTER
Wells 49-69 71,73-75 77-98 in Meade Field
Storage Wells 120-132 in Harrison Field
Storage Wells 138 139 140 in Sabinsville Field
Wells 43-48 in Hicks Run Pool
Wells 35-38, 133-136 in Greenlick Pool
Well 31 in Benezette-Driftwood Field
Wells 4-21, 23-30 in Rockton Field
Wells 32 33 34 103 10 11 113 in Reed Gosnell Field
Wells 96 97
80°
79°
78°
77°
76°
75°
42°
41°
SCALE
0 10 20 30 40 50 MILES
COMPILED BY WILLIAM S LYTLE AND VIRGINIA FAIRALL

Plate I